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ABSTRACT

This is the report of a committee appointed by the American Association of Chairmen of Medical School Departments of Pathology (AACMSDP), Inc. to assess the role and major objectives of pathology departments in the education of medical students. The report includes a summary of the overall project and findings, abstracts of the meeting and discussions held, as well as 5 sample core pathology course outlines. (HS)

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COMMITTEE TO ASSESS THE TEACHING OF PATHOLOGY
IN NEW MEDICAL SCHOOL CURRICULA

REPORT TO ANNUAL MEETING
AACMSDP
ST. LOUIS, MARCH 8, 1970

American association of Chairmen of medical School department of Pathology, Inc.

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TABLE OF CONTENTS

Introduction 3

Summary Statement 4

Abstracts of Meetings and Discussions

- Southeastern Regional Meeting, October 4, 1968 9
- Northeastern Regional Meeting, October 25, 1968 11
- Midwestern Regional Meeting, November 16, 1968 16
- Western Regional Meeting, November 30, 1968 20
- Full Committee Meeting, January 29-30, 1969 26
- Sophomore Student Discussion, February 27, 1969 48
- Report to Annual Meeting, March 9, 1969 49
- Full Committee Meeting, March 10, 1969 51
- Discussion with Professors of Medicine, May 2, 1969 56
- Full Committee Meeting, September 27, 1969 59

Sample Core Pathology Course

- #1 66
- #2 71
- #3 78
- #4 86
- #5 89

INTRODUCTION

This ad hoc committee of the AACMSDP, Inc., was appointed by Council early in 1968. The diversity of new curricula being developed in American medical schools suggested a need for a new assessment of the role and major objectives of pathology departments in the education of medical students. Consideration was also to be given to the concept of "core" courses and to the new opportunities for teaching afforded by many new curricula.

The membership of the committee was:

Earl Benditt	University of Washington
James Dawson	University of Minnesota
Abner Golden, Chairman	Georgetown University
Donald King	College of Physicians and Surgeons
Ashton Morrison	Rutgers University
Stanley Robbins	Boston University
David Smith	University of Virginia
Leland Stoddard	University of Georgia
Julien Van Lancker	Brown University

The committee applied for and received a contract in the amount of $6,400 from the then Bureau of Health Manpower, H.E.W. on November 25, 1968 (PH 108-69-31) to support its meetings and activities.

The chairman of the committee attended all four regional meetings of the AACMSDP in the fall of 1968 and led and taped discussions relating to the charge to the committee.

The committee met on three occasions: January 29-30, 1969 (Bethesda). March 10, 1969 (San Francisco); and September 27, 1969 (Bethesda). Additional discussions with medical students and professors of medicine were held by the chairman.

A preliminary summary report of committee findings was prepared in October, 1969. This report was presented and discussed extensively at the Southeastern, Midwestern and Northeastern regional meetings in the fall of 19~~70~~. Criticism of the report was incorporated into a revised report which was presented to and accepted unanimously by Council at its New Orleans meeting on January 31, 1970.

The full committee report, including five sample core pathology courses and abstracts of discussions and committee meetings is being circulated to the full membership of the AACMSDP prior to its presentation to the annual meeting on March 8, 1970.

SUMMARY STATEMENT

Pathology is one of the significant branches of medicine which derives its stimulus and reason for existence from human disease. Its methodology is that of analysis and synthesis; its contribution the evolution of rational concepts of the mechanisms and functional consequences of disease. It is the continuous orientation of pathology to clinical medicine that has made it a basic science that is fundamental to the understanding of disease.

THE PATHOLOGIST - TEACHER

A pathologist is highly qualified by his training to demonstrate the structural consequences of disease, and he is responsible for seeing that this is done. This is, however, his minimal contribution, and he must build from a knowledge of structural change an understanding of pathogenesis on the one hand and clinical or functional implications on the other. He is able to build a bridge out of structure because of his sound scientific base and his interest in human disease. This is his integrative function that permits a correlation of the basic sciences and the clinical disciplines. He is able, perhaps more than any other, to guide the student to an understanding of the disease process and its effect upon the totality of the human organism.

The pathologist demonstrates a broad orientation to medicine in his ability to teach medical students and in his point of view of disease. He is distinguished from many other physicians by not having responsibility for day-to-day therapeutics, and has a unique opportunity for perspective and objectivity.

The pathologist needs also to be seen as a contributor to medical science and a problem-solver in medicine. His demonstration of the usefulness of basic pathologic concepts in the advancement of knowledge gives meaning to his teaching in the medical curriculum, and gives him a special competence to guide students through an introduction to medicine.

PATHOLOGY IN THE MEDICAL CURRICULUM

The broad objectives of pathology in the medical curriculum are synonymous with the role of pathology in medicine. Pathology is the student's introduction to the study of disease and he must first be introduced to its language. He can then be led to an awareness of how knowledge of the structural consequences of disease advances our understanding of the evolution of disease and the mechanisms of abnormal function. By bringing to bear his experience in the basic sciences, the student will synthesize an understanding of disease and its effects on man.

These broad objectives in the medical curriculum can be accomplished in a variety of disparate ways by different departments of pathology. Such differences speak for a vigorous and healthy educational climate in American medical schools, and we cannot endorse any single or uniform pathology program for all. We do believe, however, that all students should have at least their initial experience in pathology within a department of pathology. Pathologic concepts are basic to the vocabulary of disease and cannot be presented by the internist or surgeon; indeed, many of the fundamental principles of pathology may be lost or obscured by integrated teaching. Pathologists tend to be highly sensitive to the stage of development of medical students, and can discuss altered function in terms understandable to them. Finally, the pathologist, because of the breadth of his orientation to medicine, is perhaps better able to present a comprehensive view of the sick patient than are members of highly structured and subdivided clinical departments.

There will be many secondary objectives of pathology in the medical curriculum, those that reflect the interests had abilities of faculty members in individual pathology departments, and those that are dictated by the curriculum needs of individual schools. These will be achieved by different approaches and methods of teaching, as different as case studies, lectures, seminars, slide collections, gross organ demonstrations and experimental pathology exercises. These will not be dealt with further. They are illustrated by the group of exhibits appended to this report.

CONCEPTS OF CORE PATHOLOGY COURSES

Two broad categories of core pathology courses are recognized, those that deal with core content and those that offer a core experience.

Departments that offer core content courses agree that the broad principles of general pathology are core topics, but disagree as to how comprehensive the coverage of special or organ pathology should be. The recently completed "relevance study" conducted by the National Board of Medical Examiners suggests that a core content of pathology will be difficult or impossible to define.

Other departments offer a group of participatory problem-solving experiences that require the student to manipulate his knowledge. These generally involve the case study as the basis of experience.

We regard the group of core courses appended as exhibits to this report as meritorious. They display varying emphasis on content and experience. We are persuaded that content and experience complement each other and that they are equally important in the education of the medical student.

The development of core courses emphasizes the need to reduce content and to safeguard stringently student free time in the medical curriculum. Core courses can succeed only if the student has time to read and work independently and pursue areas of special interest.

Core courses also constitute a preliminary survey of a discipline and point up the supplementary role of elective offerings. These should include a wide variety of content, and clerkship and research experience. The medical curriculum must encourage individualized education by allowing adequate time for elective studies.

THE ROLE OF EXTERNAL EXAMINATIONS

External examinations, specifically the National Boards, can relate to the measurement of a satisfactory acquisition of the basic language of disease. They tend to set minimum standards for this acquisition. Examining bodies have the responsibility of keeping aware of how pathology is being taught. It is recommended that the grading of external examinations be limited to pass-fail.

External examinations, however, should not be used to evaluate or define new curricula. Examining bodies do not desire this role and it should not be ceded to them or forced upon them.

ABSTRACTS OF MEETINGS AND DISCUSSIONS

Summary of San Antonio Discussion

October 4, 1968

The discussion was in response to the question "What is the primary responsibility of Departments of Pathology in the education of medical students?" A question was also asked concerning the possible definition of a "core" of information that should be part of the background of all physicians.

All included teaching the structural changes of disease in their answers; some felt with an emphasis on pathogenesis and etiology, but most felt the emphasis should be on the functional significance of morphology. It was pointed out that the basic vocabulary of disease must also be transmitted. Such terms as "basic concepts of disease" were also introduced.

The importance of achieving a viewpoint or approach to the study of disease, unrelated to any specific content, was emphasized by several. All felt that pathology had built-in relevance. Some felt this relevance was best transmitted by problem-solving and the case method of teaching. It was suggested that some aspects of pathology, specifically, organ pathology, were most relevant late in the curriculum.

Lee Stoddard suggested that the primary responsbility of pathology departments was "to provide a variety of pathobiomedical programs for a variety of biomedical specialists".

In discussing the teaching of pathology as a clinical rather than basic science discipline, it was suggested that no real distinction could be drawn between clinical science and basic science, but that individuals had an emotional attachment to one alignment or the other.

Nobody was pleased to discuss the concept of "core". No one would define this term, even with respect to inclusion of the most basic concepts of general pathology. It was felt that core is not a body of facts but rather perhaps a viewpoint. The importance of individual variation, both student and teacher, was stressed, with the thought that experience in the fundamentals of pathology should be encountered by different kinds of students in different educational programs.

It was felt that the integrity of pathology courses should be maintained as they represent the single cohesive course in medical school.

There was a plea for the preservation of the independence of individual instructors and individual students, and the preservation of contingency, randomness and unpredictability.

Pathology knowledge was described as a matrix, with pathology teaching filling in scattered locations in this matrix.

There was brief discussion of teaching techniques, with no very rigid points of view presented. Most agreed one could teach pathology without microscopes and class sets, and one could teach adequately using the case method entirely.

The various educational levels were outlined, including vocabulary, facts, skills, attitudes and values.

A suggestion that most basic sciences be taught as part of college education was greeted with little enthusiasm.

Abstract of Discussion at Northeast Regional Meeting

New York City - October 25, 1968

Dr. Golden traced the background of the Committee to Assess the Teaching of Pathology in New Medical School Curricula, the current status of contract support from the Bureau of Health Manpower, and the Committee plans for the coming year. Dr. Golden is to attend all four regional meetings of our Association to gather ideas for the Committee by conducting discussions of some basic problems of pathology teaching.

Dr. Golden pointed to the diversity of new curricula being developed and thought the role of pathology departments would vary in different schools. The time alloted "classical" pathology courses may be sharply reduced, but new opportunities for teaching at other levels of medical education may be created. This diversity emphasizes the importance of some fundamental questions concerning the role of pathology in the education of medical students.

Dr. Golden asked first for a definition of the primary responsibility of pathology departments in the education of medical students.

Dr. Angrist felt that the role of a pathology department was determined by the rest of the medical school faculty. Other departments may no longer recognize the place of morphology in the study of disease. He chose the example of lobar pneumonia, where other departments feel that x-ray diagnosis and effective methods of treatment obviate the need for an understanding of the evolution and effects of morphologic alterations. His faculty wants general pathology teaching expanded, with elimination of most or all of special pathology (this material to be handled by electives, with and without participation of clinical departments).

Dr. More stated that regardless of allocated hours, pathology departments must take the responsibility of giving students an integrated view of the general nature of disease processes; must give them a total concept of disease, including the multiplicity of factors involved in etiology and evolution, bringing to bear all basic information necessary for this purpose. He felt this was the minimum responsibility of pathology departments. For example, inflammation should be discussed as a biologic process and one type of reaction in disease. Its presentation should include those biochemical and immunologic factors necessary to its understanding.

Dr. Skelton felt that an integrated approach must include the impact of basic processes on the living organism, that if pathology failed to do this it would cease to remain a vital subject. Dr. More agreed, emphasizing that departments should strive to give an understanding of the mechanisms of clinical manifestations.

Dr. Golden raised the question of teaching structural change as the end point of a consideration of etiology and pathogenesis of disease, or as a take-off point for teaching disturbed physiology. Dr. Robbins stated that a core program must be an integrated approach to both the genesis and effects of disease, and that this core should be in full control of departments of pathology. Beyond this, teaching could be more flexible, depending on the educational programs of various schools. He would like to see a variety of core programs to fit multiple track systems of medical education.

A definition of core was requested. Dr. Robbins responded that core was what each chairman felt was important that students should have as part of their basic understanding of disease, or, conversely, the exclusion of all that would be considered special pathology. Dr. More considers core the responsibility of pathology departments whether or not these departments do all of the teaching. Dr. Angrist asked if lobar pneumonia should not be part of core. Drs. Skelton and Robbins replied that pneumonia as a prototype of a basic response could be core, but not the disease pneumonia as such.

Dr. Golden asked how core could be distinguished from what we are doing now. It was implied that there was a greater degree of integration, although reduced time seemed to be the principal characteristic.

Dr. More emphasized that students must have more than the core program. Somebody must lead students to the study of lobar pneumonia, including its morphologic aspects. Every student, however, need not have this specific information (e.g. psychiatry).

Dr. Grady has been reducing pathology time by weeding out that which can be eliminated, and exploring that which can be better taught together with other departments. All special pathology is taught conjointly with clinical departments. Lobar pneumonia might or might not be included. The study of liver pathology would include only hepatitis and cirrhosis. His approach is predicated upon the student having X further years of study ahead, especially in clerkships, where learning is enhanced by personal experience. He also emphasized the importance of pathology as the first experience students have in that which they are really interested in; disease. The pathology department has the opportunity to emphasize the relevance of the basic sciences.

Dr. Angrist asked if lobar pneumonia is relevant. If an understanding of the pathogenesis and pathology of lobar pneumonia is not relevant, are we not returning to a purely empiric approach to medical education, and is this not catastrophic?

Dr. Golden asked if general pathology has built-in relevance, or if we have to find ways to transmit its relevance to students. Could teaching of pathology be based entirely on the study of patients? Some felt this could be done, but would require much more time. Dr. More felt this can be done effectively and should be done. Starting with the manifestations of altered physiology can be an effective way to explore the evolution of structural alterations. Dr. Robbins considered this a tactic, a good one, that captures the excitement of the medical student. He felt a pathology clerkship could be successful, but would again require more time. He also stressed that tatics do not solve the basic problem of what to teach. The important role of pathology departments in teaching the "language of disease" was pointed out.

Dr. Skelton considered the need for getting the student personally involved in his own education, stressing the importance of "doing" rather than "listening". He wants students to have greater opportunities to do more, using all of their senses in the study of disease. He also emphasized the need and importance of enthusiastic, dedicated teachers.

Dr. Skelton pointed to the desire of students to be treated as doctors, not as graduate students. They want to know about the mechanisms of disease in so far as this will assist them to care for sick people. He believes that student motivation in medicine has changed dramatically in recent years. Dr. Robbins agreed, but questioned whether pathology departments should give them what they want as quickly as possible, or if we should attempt to give them an understanding in greater depth of the directions we think the study of disease will take in future years. We should not focus only on that which is relevant to their current point of view; rather give them a background to permit widely differing careers in medicine. Dr. Skelton felt multiple options should be available to students, including, for some, the option of no pathology course (some alarm as to the future of pathology departments greeted the latter).

Dr. Van Lancker related the Brown experience of starting without defined departments, then finding them necessary for the preservation of graduate school programs. A departmental structure is now maintained for all introductory courses (4th year). The 5th year teaching is entirely integrated and includes organ pathology. This 5th year has placed a fantastic load on the faculty, and, so far, is successful only because of the small size of the student body. (The emphasis at Brown in training students for research careers was acknowledged).

Dr. Golden asked if it is important to maintain the integrity of pathology courses, and Dr. Angrist wondered if it was possible to have no time allocated to a pathology department in the curriculum. Dr. More answered that it was not possible to give an integrated concept of disease without at least part being given by a department.

Dr. Ellis thought some consideration should be given to the definition of a medical student, and wondered if postgraduate education should not become the responsibility of the unversity. Dr. More stated this is happening in Canada and that postgraduate education is being thought of as part of the medical curriculum.

Abstract of Discussion at Midwest Regional Meeting

Kansas City - November 16, 1968

Dr. Golden traced the background of the Committee to Assess the Teaching of Pathology in New Medical School Curricula, the current status of contract support from the Bureau of Health Manpower and the Committee plans for the coming year. Dr. Golden is attending all four regional meetings of our Association to gather ideas for his Committee by conducting discussions of some basic problems of pathology teaching.

Dr. Golden pointed to the diversity of new curricula being developed and thought the role of pathology departments would vary in different schools. The time allotted "classical" pathology courses may be sharply reduced, but new opportunities for teaching at other levels of medical education may be created. This diversity emphasizes the importance of fundamental questions concerning the responsibilities of pathology departments in the education of medical students.

Dr. Golden's initial question was "What should pathology departments teach medical students about lobar pneumonia?" The discussion quickly turned to a consideration of core curriculum and the role of pathology departments in core teaching.

Dr. Wissler stated that lobar pneumonia was considered as part of the subject of the overall reaction of the lung to injury. Some years ago, lobar pneumonia was used as a model of pathogenesis and was considered in detail. More recently, it has been considered as one example of a host of different kinds of reactions of the lung in defense against noxious agents in the environment. This he considers a core approach to the early introduction of pulmonary reaction to injury. His students return to a consideration of respiratory disease in their senior year, but lobar pneumonia is probably not mentioned at this time. Dr. Wissler felt that a core curriculum needs to be reinforced later in the educational process, or the student will be left with little appreciation of the contributions of pathology. The core curriculum will be taught in the first year at the University of Chicago, but pathology will be teaching in all four years. Asked if lobar pneumonia was being taught as an example of a fundamental biologic process rather than because students need to know about this disease, Dr. Wissler replied yes. He stated that microbiologic and immunologic factors in the etiology and pathogenesis of this disorder should not be repeated if already given by other departments, but that the implications of structural change on the development of clinical symptoms should be emphasized. A key characteristic of his core curriculum is clinico-pathologic correlation.

Dr. Scarpelli stated that the microbiology department at Kansas is so steeped in microbial genetics that the only microbiology teaching the students receive is in pathology and clinical pathology.

Dr. Krakower emphasized the problem of what to teach as opposed to what students should know. This problem is accentuated by the marked expansion of medical school classes. He pointed to the importance of good text books. There was disagreement in the group as to the existence of good text books of pathology. Some felt that current texts are 10-20 years behind in facts of importance in clinico-pathologic correlation. Text books should cone in on the most critical things students should be led to and should discard the innumerable examples of disease entities. They should not be so encyclopedic. They should put more emphasis on basic principles, as did Florey. It was felt that the core of pathology changes every 3-5 years, and this is not relfected in our current texts. Dr. Eilers felt that the basic principles are in most books and that pathology departments need to give direction and guidance to the students' reading. Dr. Scarpelli stated that UAREP is considering production of a core book for teachers in pathology department who need, yearly, current information in fields such as immunopathology. He felt it was unfortunate that students often get the most modern concepts of disease from teachers in departments of medicine, and that this problem is compounded by our out-dated text books.

Asked for a definition of core, Dr. Wissler defined it as the interweaving of modern cell biology and pathobiology, the most modern cutting edge that can be reasonably relied upon, the best established general principles. Specific subject matter is included only as models and as a lead-in to clinical manifestations. He felt that a core course is of necessity an interdisciplinary presentation, although some departments such as anatomy will continue to have separate and identifiable courses. He would like the pathology department to be responsible for the core course, but feels this is impossible. Dr. Warner asked if special or organ pathology would be taught by clinical departments or by pathology. Dr. Wissler plans to teach organ pathology in the second year and "systemic" pathology in the senior year. This will be organized by the pathology department, but clinicans will participate. Responsibility lies in pathology.

Dr. Scarpelli stated that, at Kansas, core is defined as the "irreducible minimum" the student should know about disease. He agreed that it was essential for pathology to migrate to or colonize the third and fourth years, and that it made better sense for students to learn pathology while seeing patients.

Asked how core differs from what we have been doing, Dr. Wissler stated that the distinguishing features were teaching cell biology by interdepartmental approaches, and the elimination of undesirable redundancy.

Dr. Eilers asked what we were trying to accomplish with a core curriculum. He felt that this should be a distillation of principles that are unlikely to change, a foundation for medical students to use for thinking and problem solving. He felt that problem solving is the distinguishing characteristic of pathologists. Asked about teaching the pathology core entirely through the study of patients, Dr. Eilers felt that this would be insufficiently organized, that we owe medical students help in organizing their approach to disease. Lectures play an important role in up-dating text book information. He did feel that thorough exploration of all of the problems presented by a group of approximately 15 patients would cover most of the core of pathology, and that deficiencies would be made up by students teaching each other from their separate experiences.

Dr. Warner introduced the thought that pathology has always been the core course of medical education and that this core should always be the responsibility of pathology departments, even if teachers from other disciplines are employed. Dr. Warner noted that there were at least three aspects to core: 1) a _body of basic and enduring knowledge_ on which to build; 2) _a method of approach_ to medical problem solving; 3) the current status of _understanding of basic problems_ at a fairly fundamental level.

Dr. Eilers suggested that a core course could be taught to large masses of students in all health sciences, including M.D.'s, Ph.D's, technologists and nurses. He suggested that part of the core courses could be given in colleges to help students decide on their careers. Perhaps 30% of that which is currently taught in the first two years of medical school could be taught in college and not repeated in medical school. Dr. Wissler felt that 50% of the University of Chicago core could be expected of entering students from college 5-10 years from now, and that an identifiable pathology course would be needed for those students who do not take the core course.

There was brief discussion of giving relevance to a core course such as planned at Chicago. Many students are likely to consider this course too esoteric and unrelated to the care of patients.

Abstract of Discussion at Western Regional Meeting

Tuscon - November 30, 1968

Dr. Golden announced that the Committee to Assess the Teaching of Pathology in New Medical School Curricula, a standing committee of our Association, has been awarded a contract by the Bureau of Health Manpower, N.I.H. This financial support will permit the Committee to convene three times during the coming year. As a prelude to these meetings, Dr. Golden has been attending all four regional meetings of the Association to gather ideas for committee discussion.

Dr. Golden suggested that pathology departments will be called upon to teach in many different ways in the variety of new curricula being developed. He thought that this variation emphasizes the importance of pathologists defining their role in the education of medical students. Regardless of how pathology is taught, or where it is taught in the curriculum, the primary responsibility of all pathology departments in undergraduate medical education probably remains the same. Discussion of this primary responsibility was extensive at the other three regional meetings. In all three, however, discussion invariably turned to a consideration of core curriculum, and it became apparent that various chairmen had very differing concepts of core curriculum and the role of pathology departments in the teaching of a core curriculum. Core was defined as a viewpoint or approach, unrelated to subject content. It was also defined as the "irreducible minimum" the student must know about disease. To some, core meant an "integrated" approach to the genesis and effects of disease, an approach that should be under full control of pathology departments. It was also defined as the interweaving of cell biology and pathobiology, of necessity an interdisciplinary course, unlikely to be under the control of pathology departments. A few thought core is what we are doing now; some that it was some fraction of what we are doing. To others, core is the distillation of unchanging basic principles, although some felt these basic principles change every 3-5 years.

Dr. Golden asked those attending for their concept of core. Dr. Benditt described the core at Seattle. It consists principally of Cell Biology, "Control Mechanisms" (an amalgamation of physiology and pharmacology), and "Tissue Structure and Embryogenesis". Pathology teaching starts in the second year and is called "Tissue Response to Injury". Included here also is the teaching of infectious diseases, closely integrated with "elementary" pathology. The remainder of pathology is taught by the systems approach and is committee constructed and presented. A pathologist is always a member of each committee. Basic pathology is a separate unit. Pressed for a definition of core, Dr. Benditt stated it is "the basic knowledge medical students should have prior to development of individual interests." (The initial clerkship period at Seattle is also part of the core curriculum). Dr. Benditt also defined core as a "certain body of knowledge as the common experience of all who are to receive an M.D. degree."

Dr. Korn stated that Stanford has so "liberalized" its requirements for graduation that is has almost made core that which is necessary to pass National Board examinations, hence, a minimum body of knowledge demanded for medical students.

Dr. Benditt objected to the definition of core as an interweaving of cell biology and pathobiology, as much of pathology is not cell biology. This approach is not realistic in relation to what biologic sciences have been doing. He gave the examples of ecology, interaction of man with man, and man with environment

Dr. Golden pointed to the total integration of general pathology into the core course cell biology at the University of Chicago, and asked if the teaching of general pathology should not be maintained as an integral identifiable unit in the curriculum. Dr. Layton replied that Western Reserve had found it necessary to reestablish a course on basic disease processes (c. 1954) apart from committee presentation. It was thought that the total weaving of general pathology into an interdisciplinary course was unsatisfactory. Several members of the group disagreed with this conclusion, and felt that pathology and pathologists could always be identified, and that nothing was lost by integration.

Dr. Korn bemoaned the changes in pathology teaching at Harvard Medical School. He felt that several years ago the pathology department gave a very strong and good course, but by now participates very little in the integrated teaching program. There are currently only about 15 hours allotted to pathology. The question was asked if this is not similar to what is happening to anatomy. Dr. Korn did not consider the two disciplines comparable in that gross anatomy is now a self-contained discipline that has no new contributions to make to medical science. It exists purely as a teaching function. He pointed out that Stanford considered dismembering the anatomy department, giving gross anatomy to surgery and histology to pathology. Dr. Korn considers microscopic anatomy prototypic cell biology.

Does there have to be a pathology course? Dr. Stowell thought not; that medical students can learn a reasonable amount of pathology in integrated teaching situations. Dr. Pierce agreed that there are many ways pathology can be taught or, rather, learned. He felt we put too much emphasis on what to teach, not on what or how the medical student learns. If the student wants to learn pathology entirely on his own, we must listen to his proposal.

Dr. Pierce questioned the desirability or necessity of a core. Dr. Korn replied that every discipline has its core. It can be very variable from school to school. Dr. Madden thought that core is "a sort of an undefined minimum body of information". He thought we should assume that pathology departments give adequate courses and should not attempt to standardize core courses. He thought that a committee should not assume the task of defining or describing a core for any discipline.

Mention was made of the paradox of progressive reduction of time allocated to pathology courses and the constant expansion of text books. It was suggested that text books are written for the approval of one's peers, not for students.

Dr. Madden felt the task of pathology departments is to give an introductory survey of pathology and to urge and encourage medical students to then pursue areas of special interest. This survey should emphasize the tools pathologists use for the study of disease. Dr. Korn asked if pathology has unique tools that justify its existence as an academic discipline. Dr. Madden agreed that others use the same tools, but pathologists are more proficient in their use. He felt that most pathologists are "generalists" and we should not put too much emphasis on the generalist's approach to disease. This has hampered our development as a discipline. We should rather emphasize to the student the selection of areas for long term study.

Dr. Golden pointed to the attitude expressed at the Northeastern meeting that pathology departments had the responsibility to present "integrated total concepts of disease processes", not including the tools of study, but emphasizing the genesis and effects of disease. Dr. Madden felt this would deter the best students from the study of pathology, being too overpowering an approach and one which would require pathology departments to control the core curriculum. Dr. Madden was asked if the professional role of pathologists is not a "generalists'" role.

Dr. Stowell stated we have to teach much more than a body of information. We have to teach approaches, concepts, and methods of solving problems that the medical student can use in his continuing education. Dr. Golden referred to a statement made at the Kansas City meeting that the most modern concepts of disease are often presented by the departments of medicine, not pathology. This was thought to reflect a failure on the part of pathology departments in their broader role, namely, of presenting an integrated concept of disease. Dr. Madden felt too much emphasis is placed on this broad role of pathology. We should perhaps have the more limited role of an introductory survey and expand only in those areas in which we have competence (doing as well in these areas as a department of medicine). Dr. Korn referred to the large size of departments of medicine and their subdivision into units that are highly competent in areas of specialization. Pathology departments are generally much smaller and are thus limited in the areas of medical science in which they can be expert. The attempt to teach and practice the "big picture" is in conflict with attempts to be a specialist, even in investigation. For this reason, many in other departments are better able to teach special areas of pathology. Nevertheless, medical students seem to want the big picture from pathology departments; they want to have a total concept of what has happened to a total patient.

Dr. Layton stated that at Arizona they start with basic information on fundamental disease processes, or reaction to injury, with consideration of both structure and function. They then give "transformation rules"; how to apply basic information to clinical situations. For example, how are inflammation and repair related to the study of tuberculosis? He felt students need extensive practice in using these transformation rules. He pointed to the role of interdisciplinary laboratories in encouraging students to do this correlation on their own. The internist who comes to the laboratory appears to the student as part clinician, part clinical pathologist. Dr. Korn felt there was danger in being the overall correlator without making a personal contribution. He stated that when committee teaching started at Harvard a pathologist was almost always the chairman of each subject committee. Now, others have gradually taken over the entire show.

There was discussion of presenting pathology to the medical student through a pathology clerkship. Could guiding students through the study of individual patients accomplish the integration felt by many to be so desirable? Some thought that a general introduction would have to precede such a clerkship, although almost every patient who comes to autopsy illustrates principles of general pathology. Dr. Berditt thought the case study method was a good approach to the teaching of "elementary" pathology, the most exciting method for both teacher and student, but requiring continued hard work.

Dr. Benditt wondered why internal medicine has subsumed so much of the teaching in medical school. He wondered if anatomy and pathology are not "closed boxes" as regards current excitement in medicine. Dr. Korn stated that everyone used to come to the autopsy room to find out "what's going on" and "what happened" (post script: do we as pathologists no longer know what happened? - A.G.). Pathology needs to grow and move as has medicine.

Dr. Korn felt that the transfer of a body of information to medical students was not sufficient reason to justify our existance. We must constantly be searching for new information. He asked the group to consider its choice of faculty if it could structure a course Introduction to Disease any way it wanted. How many pathologists would be included on the faculty? How many "experts" are there in pathology departments? One answer is that we should do well what we can do well even if our teaching seems superfically very unbalanced. Dr. Madden agreed with this and thought we should place less emphasis on "experts" for undergraduate students. Dr. Pierce felt we should not spend our time "boning up" on the latest advanced information, but should rather devote our efforts to deciding what students need from us, and to organize this information. Dr. Madden, referring to Dr. Korn's question, stated that pathology departments should not be given the opportunity to structure a course Introduction to Medicine; pathology should be one of 10 or 15 groups teaching this introduction. Designing such a course would make one subservient to committees and prevent expression of our own viewpoints.

COMMITTEE TO ASSESS THE TEACHING OF PATHOLOGY IN NEW MEDICAL SCHOOL CURRICULA

Meeting of January 29-30, 1969, Bethesda, Maryland

Abstract of Discussion

Present: Benditt, Golden, King, van Lancker, Morrison, Smith, Stoddard, Robbins
Absent: Dawson

The Committee was asked to address its discussion to the primary responsibility of pathology departments in the education of medical students, following a review of the varied thoughts expressed at the four regional meetings. Don King felt that this could not be defined nationally because the responsibilities have already been set locally in many institutions, set by the faculty or the curriculum. The best we can do is to list ways in which pathology departments can play major roles in the schools. The role at present is determined by the strength of the departmentsover the past 10 years. We don't know the ideal role. If a department has sufficient strength, it can play the role of "bridging" the basic sciences and clinical disciplines. The best departments are the largest; it is no longer possible to have a small quality department if one wants to play a dominant role in the medical school. Depending on the given local situation. there is a range of major responsibilities pathology can take in the curriculum: 1) core anatomical knowledge; presented as a separate body of knowledge or in integrated committee teaching; 2) pathobiology knowledge (i.e., general pathology), in some schools totally integrated with basic science departments, but preferably a Department of Pathology course; 3) committee systemic pathology; here, the most to expect is participation, because of the importance of correlation with clinical medicine, clinical pharmacology, physiology; 4) clinical pathology; every pathology department should get into this any way it can, as the dominant or subsidiary group in clinical pathology teaching; 5) strong effort at developing significant electives; we need more than autopsy electives or clinical pathology electives; we must evaluate the potential of all members of pathology departments for departmental or interdepartmental electives; 6) teach in college and teach in graduate school. We can't set up an ideal program for all pathology departments. This depends on local situations. However, we cannot retire or retreat from movement in these directions.

Ab Golden asked if our primary responsibility was not the same, regardless of local modifying factors.

Earl Benditt stated that the curriculum is in a state of flux. We need to set goals and get there first with competence. Pathology is the basic science of the curriculum. Biochemistry, microbiology and possible anatomy are in a position of irrelevance to medical student teaching. They are now university disciplines with no necessary connection with medical schools.

Dave Smith wondered if microbiology and biochemistry should be taught in college. Stan Robbins warned that theis would be squeezing college education to the point where a liberal education was impossible. Lee Stoddard felt that society is already developing educational systems in which students get sophisticated courses earlier and become "specialists" earlier in their lives. Perhaps we need to admit students at different levels of the medical school curriculum depending on their preparation. Stan Robbins thought this would be preferable to destroying college education by moving the basic sciences back into college and having a single sterotyped product. Earl Benditt thought that pathology should not be in the undergraduate years, but Dave Smith thought a good deal of general pathology could be taught as part of biology.

Julien van Lancker pointed to the role of pathology in advancing knowledge, and thought that this might be its most important role. He thought teaching is best done in electives, participation in college education, and research training. He thought there were several ways to build important departments of pathology. We should build by greater involvement in college and other university activities (including animal and plant pathology).

Lee Stoddard suggested that the role of this committee is to suggest different kinds of patterns that different departments might develop.

Ab Golden wondered if small departments of pathology were necessarily limited in their roles. Couldn't they give a survey introductory course in mechanisms of disease, and then do what they are capable of doing well in systemic pathology without trying to cover all areas? Julien van Lancker stated that one cannot give an introduction to disease with a few anatomical pathologists. We need biochemistry, physical chemistry and biomathematics. Even if these people are in other departments, they can't communicate with students in relation to disease unless they have had experience in the study of the anatomy of disease. We need competent people with varied backgrounds in pathology departments to present an introductory survey, and work in problems relating to mechanisms of production of disease. The problems of pathology are now much more complex than those of studying vitamin deficiency and inborn errors of metabolism.

Earl Benditt felt we need people who understand the problems of disease and know how to use the ideas and the tools of pathology. Dave Smith stated that many other departments also have a primary interest in disease (and may use the same tools). Is there anything such as "pathology." left? Earl Benditt stated pathology is a body of knowledge.

Stan Robbins felt the discussion thus far was defensive, an apology for what is happening to pathology. The limits are already defined by size, competence, etc. We have not defined our goals. What should we shoot for as pathology departments? Lee Stoddard suggested we should not set perimeters for ourselves or anyone else. We need more flexible goals to permit functioning in specific local situations. Stan Robbins thought we should define our optimal or median role, and asked what we regard to be the essence of pathology. He is not sure if it is a body of knowledge, or perhaps a certain approach to the study of disease that involves being a bridging science. Don King stated that core anatomical knowledge is the only body of knowledge unique to pathology. Ab Golden wondered if this is sufficient justification for the continuation of pathology departments as teaching disciplines. Julien van Lancker answered that pathology offers a service whereas anatomy does not. Earl Benditt added that pathology has maintained an interest in human disease in contrast to anatomy, biochemistry, etc. who have not.

Dave Smith stated that one of the inherent properties of pathology is that it belongs to a level of science which is at an integrative level higher than molecular analysis and pointing towards the structural, whereas others point toward the functional. Is this our contribution to science and to medical education; our uniqueness? Stan Robbins felt that the interpretation of function in terms of structure was an equally important attribute.

Ab Golden wondered if our defensiveness was based on our loss of ability to keep up with internal medicine, so that we no longer can supply anatomic (and functional)answers to the questions they pose.

Referring to our role as a bridge discipline, Don King wondered what are the bridge subjects, if any, and if we are competent to handle them. He wondered what we are doing to keep pathologists feeling comfortable in an environment of increasing sophistication of medicine and medical students. Earl Benditt felt that we need a much broader view of the entire structure of medicine and should seek the role of pathology as a contributor to medicine. We need to find points to be bridged. Lee Stoddard emphasized that bridging is done every day by those pathologists who are capable of communicating with others (clinician, who have patients). We must offer something better than they can do themselves, particularly in the area of structure. Dave Smith emphasized the opportunity to build a bridge out of structure and that pathology can do this because it maintains contact with both basic science and clinical medicine. This is its integrative function, and permits a concise presentation to the student that tends to focus on the correlation of the basic sciences and clinical disciplines. Julien van Lancker felt that this is more our responsibility than structure alone, that the pathologist is the person most competent to go from molecular alterations to the production of full-blown disease. He felt it is our responsibility to see that this is done, regardless of who does it.

Dave Smith pointed out that the discussion was leading away from committee teaching, leaving integration entirely to the medical student (where perhaps it belongs). He felt pathology can make a greater contribution in teaching than a series of experts, Stan Robbins thought we could all agree that however one teaches it, the pathologist is best qualified to demonstrate the structural consequences of disease. If a member of a department of medicine does this, he is serving as a pathologist when he does so. There is an area of medicine that is pathology. Don King felt that this is not enough. The pathologist must be an integrator of physiology, chemistry, structure, etc. Stan Robbins wondered whether pathology should optimally be capable of presenting the integrative picture of all of medicine. Julien van Lancker suggested that the pathologist knows the structural manifestations of disease, and this is his minimal contribution; no one else really knows this. Don King felt we could all agree that the pathologist knows the structure, gross and histologic, and should be responsible for teaching this if no one in the school knows it better.

Stan Robbins thought that we should now build from this point. We must also have some areas and levels of competence in the pathogenesis of structural change on one hand, and clinical implications on the other (this is the "bridge"). We can't do this if we don't have the manpower and competence. We have attempted to circumscribe an area that is ours even if we don't have the competence to handle it. Ab Golden thought small departments could perform this function in some areas and yield others to other departments that can do it better. In other words, the size of a department of pathology can determine its curricular time, but does not alter its primary role.

Lee Stoddard suggested that pathologists are handicapped by not "owning' patients, but have the advantage of time to do more than others in "bridging". He emphasized the importance of interpersonal relationships with other faculties. Ab Golden suggested that we do own a patient as a teaching vehicle for a period of time. Earl Benditt suggested that the clinician also finds himself in a new role, and is uncomfortable in committee teaching as opposed to demonstrating with his patient.

Ab Golden wondered if our role is that of the "generalist", as opposed, for example, to the subspecialists of departments of medicine., Earl Benditt thought the answer was yes, in a sense, in terms of our ability to teach medical students, and a point of view. Clinicians, particularly in hematology, gastroenterology, liver and kidney, may look at structure but tend to have gun-barrel vision, and lose a broad understanding of disease. Stan Robbins stated that the clinician recognizes to a greater or lesser degree his incompetence in areas of "pathology", but this does not make the pathologist a generalist, as he would then be assuming for himself responsibility in the entire sphere of medical education. Don King wondered if we do a good job in the first two years of medical school with a broad approach, and then fall flat in the 3rd and 4th years, when gun-barrel vision may be accurate. Earl Benditt felt this pointed again to the necessity of a large department that can have competence in depth in many areas, and contribute throughout systemic organ pathology.

Earl Benditt felt that our real task was to define the pathology that should appear in the medical school curriculum, not who should teach it. This was the responsibility of the department of pathology. A department could then be built based on local needs and capabilities of the entire school.

Lee Stoddard suggested we are confusing various aspects of pathology; pathology, the department; pathology, a discipline; pathology, a body of knowledge; pathology, a point of view.

Don King thought our role was hard to define because most clinical faculties feel that pathology departments can be dispensed with in the teaching of students. Stan Robbins took strong exception, stating that internists do not have confidence in their own ability to take over this function. The clinicians want something broader, more integrated than the highly specialized clinician can offer.

Earl Benditt thought a basic question related to the content of our discipline. We have discussed structure, pathogenetic relationships and overall point of view. Is pathology teaching really necessary to the production of adequate practicing physicians? He drew the analogy of the training of TV repair men. They start with structural design and the basic principles of how a TV set is structured and functions, but the practical problems faced in the field relate to "what does this symptom mean?" The same is true of the medical student. We ask him to learn structural design and function without knowing what a sick patient looks like. Some curricula start with clinical experience, and then return to the study of structure and pathogenesis.

The group was asked if a certain point of view of disease is part of our province and responsibility. Lee Stoddard responded that ours was a medical view point toward medical biology. Stan Robbins wondered how this viewpoint differed from those of others in medicine. Lee Stoddard stated that as a "viewpoint", pathology can be shared by persons in many disciplines. Stan Robbins asked if we have a different vantage point, or if our viewpoint is shared by all who work for a favored competitive position for man in his environment. He wondered if we could define a unique pathology point of view. We are most concerned with an understanding of the mechanisms and implications of structural alteration. We are also concerned with how patients can best be treated, but this is not our major concern. Dave Smith thought our viewpoint placed an emphasis on analysis of natural phenomena related to disease; that this should be in the best scientific system we can apply within our resources.

Again, this is not unique to pathology, but pathologists are in an ideal position to transmit this point of view. Stan Robbins thought we might lose this favored position should the internists get students before we do in the new curriculum. Dave Smith thought the pathologist can still take a more detached viewpoint as he is not burdened by the responsibility of patient care. He wondered if there was not some strength in not being so big where subdivision and isolation is necessary. Archie Morrison wondered if many clinicians with less patient care responsibility could not do this as well or better. Dave Smith thought that this was possible but that we still have a favored position for this in the curriculum. He thought we need to be a cohesive, somewhat "generalist" group that can present an introduction to the student.

Ab Golden referred to Earl Benditt's statement that pathology was the basic science of medical school, and wondered if it could not also be the clinical science of medical school. He wondered how our approach to the study of disease differed from that of the clinician. Earl Benditt indicated that it was different because we are not really concerned with therapeutics. Julien van Lancker thought the main difference was that pathology had more concern with pathogenesis, not with diagnosis. We are not really concerned with an attempt to solve the overall problems of the patient, or making therapeutic decisions.

Ab Golden wondered whether we, in our teaching, transmit to the student what the pathologist's role is in the overall picture of medicine. Lee Stoddard stated that we are the last department to give a course. After that, teaching is done where the action is. This pointed to the usefulness of the case method of teaching of pathology. Ab Golden stated that students see the clinician as a problem solver, and wondered if they see us also as problem solvers. Earl Benditt replied that this depended on how much they are brought into our daily work.

Stan Robbins proposed that pathology is an understanding of the mechanisms of the development of disease; the structural implications, and the clinical implications. All pathology departments teach the mechanisms of the inflammatory response, what it is and what it means. This is the particular and peculiar viewpoint of pathology as a discipline and as a part of the medical curriculum, as opposed to psychiatry, pharmacology, internal medicine, etc. All disciplines however are interested in improving man's competitive position in his environment.

The question was raised as to what clinicians want us to do with students to prepare them for their clinical work. Earl Benditt thought that they wanted us to give them the basic vocabulary of disease and anatomic aberrations that are seen, but that clinicians want to teach "pathophysiology". Dave Smith thought there was considerable local variation in this. The clinicians want to discuss mechanisms of disease, but they want to start at an advanced level. Earl Benditt thought that an important part of the problem was the large numbers of experimental pathologists in departments of medicine. He thought this resulted in a changing relationship between these departments and pathology. Ab Golden wondered if students get more modern concepts of disease from departments of medicine then from pathology. Earl Benditt thought often yes. The volume of work and sophistication of work of experimental pathologists in departments of medicine exceeds that of departments of pathology out of proportion to manpower alone. He thought we need two types of people. Some study genetics, cell injury, inflammation, neoplasia, immunology; that is, general elementary pathology. Then, we have to match the clinical departments in skin, heart, etc. He thought there was overlap in each individual, however, between interest in general pathology and system problems. The real substance of pathology is the basic processes. A successful pathology department will have to perform well both in basic processes of elementary pathology and the specialized areas of systemic pathology, structurally and functionally.

Dave Smith thought that in most situations we do not have the resources for real pathology department development. We may have to define our unique role without attaining the goal of multiplicity of expertism. Society has invested in departments of medicine much more than in departments of pathology. Earl Benditt thought we need to draw experts from other departments into closer collaborative operation with pathology. New forms of curriculum may be doing this.

Stan Robbins stated that pathologists can play a role that is distinct from that of all others by virtue of their viewpoint and special knowledge and concern with patient disease. Lee Stoddard asked himself what makes a pathologist unique among M.D.s. The only answer he could come up with is that the pathologist does not treat patients. What are the consequences to student teaching? He has time for perspective (or an obligation to seek time for perspective). His position gives him a greater opportunity for objectivity. He can pay more attention to structure, because he has the opportunity in the laboratory to make things stand still.

Earl Benditt thought that part of the uniqueness of the pathologist was his role as a monitor in the autopsy room. The pathologist has a detachment from the immediate necessity to make judgements involving patient care. The monitor function must be performed as a teacher, not as a policeman. Dave Smith wondered how we could use this monitor position to apply to our position in the curriculum. What can we contribute from this unique position to the medical student's education? How can we build on this? Lee Stoddard thought that this points to the importance of our teaching in the 3rd and 4th years of medical school, with other people, and perhaps to less importance to our teaching by pathology alone early in the curriculum. Dave Smith again pointed to the importance of synthesis in the teaching of the pathologist.

Earl Benditt emphasized the importance of experimenting with the curriculum. He is willing to go to the extreme in integrated teaching and then evaluate the results. He thinks we will return somehwat to departmental offerings, perhaps in different areas of the curriculum and through electives and graduate school teaching.

Lee Stoddard conceived the pathologist as standing on a firm foundation of experience with the human species. Various inputs (experts) came through him, and his output was focused through a lens of structure (with objectivity) yielding a synthesis.

It was asked if the basic body of knowledge of pathology, the core of pathology is to be part of the education of all medical students. Stan Robbins thought yes, but that this body of knowledge needs to be carefully defined and limited. He is unconcerned with how it is presented; departmentally or by committee, so long as those with the greatest competence are contributing to the educational experiences of medical students. He thought there would be wide variation from school to school, but that one could define a common area of overlap. Our courses as presently given indicate this. Dave Smith agreed but thought that the core would be defined at a high level of abstraction. As soon as we try to get down to specifics, we fail to achieve any degree of uniformity. Stan Robbins thought that we should teach only those aspects where we have real sophisticated expertise. All would agree that the concept of the inflammatory response should be known to all, but different departments might teach very different things about inflammation; some emphasizing biochemistry, some capillary ultrastructure. It was felt that this part of the pathology core was suitable for the background of many professionals; dentists, veterinarians, Ph.Ds, etc.

Archie Morrison asked if there would be another core for systemic pathology for all medical students. Earl Benditt said yes, Stan Robbins, maybe. Earl Benditt thought we have to cover the systems in at least a minimal fashion. Stan Robbins asked if the future orthopedic surgeon should be required to take the skin block. Earl Benditt replied yes. The orthopedic surgeon has a very narrow view of medicine. All should be reasonably educated in human disease to be called "doctor'. Stan Robbins thought that some areas of systemic pathology should be part of the experience of all medical students, but some of the specialized areas (gynecology, genitourinary) are less significant, less useful, and not remembered. Earl Benditt thought that we can reduce all areas of systemic pathology to a minimum that can have meaning for all. Otherwise, why not take kids out of high school, teach them a minimum on bone structure and bone healing, and then apprentice them to a surgeon? They could become quite expert in caring for fractures. But, "M.D." means more and implies more. We cannot leave out any "important" system. Lee Stoddard commented that we are faced with demands from society to shorten medical education, and we are unwilling to give. We agree that dentists get a different kind of degree from the large mixture of people who get the M.D. degree. Why should the orthopedic surgeon get the same education as other M.D.s? We can't contend any longer that all M.D.s need to be exposed to the same things, especially in "organ pathology".

Earl Benditt stated that in the systems area, the student learns about anatomy, physiology, special aspects of biochemistry and principal disease aberrations. This can be done briefly, including certain aspects of physical diagnosis. We can't let anybody out of medical school without exposure to all of these. Stan Robbins asked if all blocks should be the same and for all. Earl Benditt said yes, this is the core. Ab Golden stated that the content of the core then was the totality of pathology. Earl Benditt indicated yes, "head to toe". Anyone with an M.D. degree, for a while at least, should have certain basic knowledge of a physician. Specialization can begin at the very outset of medical school through some electives and can get strong after the first 6 quarters.

Stan Robbins stated he was not sure about this. He would include certain vertical blocks as core, others as electives. All should have a working knowledge of heart, lungs, kidneys, G.I. tract, and one or two other systems. But he found it hard to evaluate skin, genital tract, etc.

Julien van Lancker stated that the medical school has three major responsibilities to society. It must provide people who can reproduce themselves (teachers). It must provide enough people to perform the services that society needs. It must provide people who will advance medicine through research. Do all of these people need the same training? For the teacher and research man, we cannot change the existing curriculum very much; for those providing service, yes, we can drastically revise the curriculum. But, some form of superior curriculum must be preserved.

Earl Benditt said he was not yet ready to split medical training into different levels. We need to give the student the opportunity to see all aspects of medicine and leave the potential for developing in any direction. He would drop much detail, with preservation of a reasonable degree of latitude of choice. Students may make choices early but cannot be totally committed to a particular career until after the first year and a half of school (University of Washington).

Lee Stoddard stated that the synthesis that is the contribution of pathology does not involve any particular organ system, but rather that of the whole man functioning in his environment. The organ approach can far better be left to the later years of education and the specialized time of his career. Earl Benditt thought that nobody with large gaps in his knowledge of major organ systems will ever be able to comprehend this synthesis in relationship to the whole man. Ab Golden drew attention to the medical clerkship, where there may be large gaps in an individual student's experience. Earl Benditt was asked what distinguished his teaching in the new curriculum from what he did in the past. He replied that the principal changes were efficiency and a reduction in the total mass of information taught.

Julien van Lancker did not think we could efficiently shorten medical education without controlling undergraduate college education. Earl Benditt thought we could take students from high school or after two years of college; start them on the wards taking histories and physicals, etc., learning as the intern does. We could in this way produce perfectly reasonable physicians in three years. He would hope to increase our output of physicians through shorter curricula, rather than further enlargement of medical school classes.

Stan Robbins stated he has been in favor of some exposure to the totality of medicine and the totality of man. He is also keenly aware that our product has recall for only that knowledge which it can use in a particular career. Lee Stoddard felt that the family physician of the future is not going to be a head to toe physician; he will rather have some specialization in internal medicine, pediatrics, psychiatry, dermatology.

Julien van Lancker thought we had agreed on two things; the need for general concepts (inflammation, etc.), and the need to learn to solve problems in a head to toe approach to the patient. Why not forget about the core curriculum? Just use the case presentation method in an organized fashion. The core would come out of the cases; the student would synthesize his own core of what is important to his practice of medicine. Earl Benditt stated he still felt there had to be some rounded exposure before specialized training. Dave Smith stated that core is a very abstract concept. We can subscribe to certain basic exposure and certain lapse of time, but could hardly agree on specific content.

Earl Benditt hates to see the total disappearance of the "rugged individualist" in medicine, a man with some flexibility in his career development. Lee Stoddard agreed, but did not feel we help the man who is going to work in one area by taking him through all of medicine, even in a superficial manner.

Dave Smith stated that we need to keep learning skills and should not abandon laboratories entirely in student teaching. Earl Benditt agreed that all students should have intensive laboratory experience, with options of choosing specific disciplines or areas. Dave Smith asked why this could not be applied to systemic pathology, with the option to go into depth in several areas rather than a superficial survey. Earl Benditt felt that this was implied, through electives.

Stan Robbins stated that the concept that an M.D. is an M.D. is an M.D. is obsolete. There is no such thing as an M.D., just as there is no such thing as an engineer, a physicist, etc. The generalist is more likely to become obsolescent than the man in a narrow field. Ab Golden added that if there is no such thing as an all-purpose physician, why do we persist in giving an all-purpose education? Stan Robbins suggested the problem was where to cut off the all-purpose education, and that Earl Benditt would do it somewhat later than the rest of us. Lee Stoddard added that our classical education in medicine has impeded our ability to adjust to changes in medicine. Earl Benditt thought that we were stuck because we had learned a trade in going to medical school, not a scientific discipline.

Discussion turned to the use of elective time, and it was pointed out that much of the earlier discussion was based on the assumption that significant elective time would be available in the curriculum. Dave Smith thought that the electives offered would depend on local factors; space and dollars. Stan Robbins thought that electives should offer a variety of options, all with considerable breadth and depth in pathology training; i.e., clerkship and research experience. Dave Smith indicated that there should be room for a student to study techniques. Stan Robbins stated that the 4th year at Boston University is entirely elective but each student must elect from at least 2 disciplines. Our problem is to attract them to pathology.

Ab Golden asked if the modern medical student considered pathology relevent to his education, and wondered if there has been a change in the motivation of medical students. Some students, at least, seem to want only that which is important to the care of patients. Stan Robbins thought that there was probably no fundamental change in medical students' motivation. Students enter school filled with a desire to be doctors. The basic sciences frustrate this objective, and they are "turned off" by the time they reach pathology. Dave Smith pointed to pathology as an introduction to disease and thought that it automatically had built-in relevance and interest. Ab Golden asked if we might not lose this built-in relevance and interest through core integrated teaching. Stan Robbins emphasized that pathology has a tremendous opportunity to provide the medical student his first real awareness of his growing medical education.

Lee Stoddard thought we should recognize that there is no such thing as the medical student. We have to be many different kinds of pathologists who do many different kinds of things, and include students. Archie Morrison pointed to the manpower of clinical departments that permits teaching at many levels and attracts students at each level. Ab Golden thought that the way we teach should reflect our enjoyment of our discipline. Here, too, electives offer a major opportunity. Stan Robbins thought that the attraction of students posed a real problem. Pathology has suffered from the pressures of time and growing complexity of medicine whereby we provide fewer and fewer answers to increasingly complex questions. Dave Smith stated that we are outside the students' concept of clinician. They don't see us with the living patient.

Lee Stoddard suggested a need to enlarge the professional complexion of pathology by bringing into it large numbers of Ph.D.s to help with teaching. M.D.s should have more time to devote to students in work with human medicine. Stan Robbins agreed that the development of a teaching core of non-M.D. pathologists would permit greater participation by pathologists in exercises that demonstrate our interest in the implications of our discipline to the patient. Archie Morrison thought this could be emphasized by the use of voluntary faculty in affiliated hospitals. They can make a major contribution by demonstrating the life of the pathologist and his role in medical care.

Stan Robbins emphasized the role of attending autopsies in demonstrating our place in problem solving in medicine. Dave Smith thought autopsy attendance was too expensive of student time because of the concomitant use of the autopsy for resident training. Archie Morrison emphasized that students get a great deal from attending autopsies at community hospitals affiliated with the medical school. Lee Stoddard thought the resident autopsy would have to be separated from the student case. Stan Robbins thought that we are not using the autopsy enough in our teaching, and that this may be part of the reason for students feeling that pathology lacks relevance to medicine. Lee Stoddard thought students are driven from pathology by "oversight" autopsy experience. They consult the experts in cardiac physiology, etc., who give answers to their questions. They get nothing from watching the autopsy except the impression that pathology has little to do with human disease. Ab Golden stated that he disagreed strongly, providing continuity was supplied to this experience by a single instructor who worked with students. Stan Robbins suggested that we have so depersonalized pathology as to fail to take advantage of the students' interest in people. The professor has been divorced or has divorced himself from the autopsy table.

Stan Robbins characterized the medical student's attitude today as one concerned with the provision of medical care to the community and to the underpriviledged. The student is less interested in the scientific basis, because he sees we can know a great deal of science and still permit people to die of diseases for which we know the cure.

Dave Smith thought our report should emphasize that out of experience and opportunities available to the pathologist, he is particularly qualified to offer to the student within the curriculum an introduction and demonstration of the use of structural concepts in increasing his knowledge. Our viewpoint is one of analysis and conclusion. Pathology as a department and as a discipline offers an opportunity for meaningful laboratory experience to the early medical student. He thought we should also emphasize that pathology is taught by people who are continuously in contact with clinical phenomena, and are consequently different teachers from the Ph. D.s in other basic sciences, and, consequently, pathology is more relevant to the professional goals of the medical student. Then, we should expand this into a number of applications that can be exploited to the limit of our ability. The four factors; structure, monitor function, meaningful laboratory experience, and relevance to students' goals; these are the major basis for the pathology role in the curriculum.

Lee Stoddard thought we must offer a heterogeneity of opportunity to match the heterogeneity of student interest, and that this would best be accomplished through elective opportunities in the educational experience. We must cope with unscheduled time in the new curricula.

Stan Robbins repeated that we must continuously emphasize to the student that we are interested in clinical medicine and that we are studying it from our own peculiar viewpoint. Lee Stoddard thought we could all agree that we cannot pretend to be everything; our real strength is in the conceptualizing of medical reality in structural terms and to really be good at this.

Ab Golden asked what our responsibilities were in the teaching of clinical pathology. Archie Morrison thought we had nothing to teach concerning skills, but that we needed to teach the student how to interpret laboratory findings. Dave Smith thought that our responsibilities and opportunities were clear in this area, and that we are passing up these opportunities by default. Stan Robbins agreed that we had responsibility in the teaching of clinical pathology. If we teach pathology with its clinical implications we must of necessity get involved in the interpretation of clinical pathology data. Dave Smith thought we should not try to create separate courses in clinical pathology in the present climate. This body of knowledge, however, should be dealt with in the curriculum, and we should enlarge our role in this. Lee Stoddard suggested that techniques could be part of an elective program, but Dave Smith thought techniques should not be part of medical student education.

Lee Stoddard suggested that the clinical laboratory opened up the study of the ecology of morbidity. Our practicing colleagues may have a broader view than we on the contribution of clinical pathology to the education of the medical student. Lee Stoddard and Stan Robbins agreed that clinical pathology was one of the legitimate opportunities of the unscheduled curriculum, but Dave Smith asked if it was not also a legitimate part of the basic core presentation. Stan Robbins stated that clinical pathology includes the interpretation of laboratory data, but also some experience in the acquisition of data. Some of this is part of the immediacy of pathology in the care of patients.

Lee Stoddard stated that he had heard the point of view that pathology is too concerned with mortality. It should be more involved in morbidity, especially through the clinical pathology laboratory. Ab Golden asked if we are not really studying morbidity when examining mortality, and Stan Robbins stated that we are always focusing on dynamics.

Lee Stoddard wondered if the ecology of human disease should be the realm of the professional ecologist, and if we should open our departments to such people and accept it as a part of our responsibility. Archie Morrison thought that the ecologic aspects of clinical pathology should be an elective opportunity. Dave Smith thought that in some departments, it could be part of the pathology core presentation. Stan Robbins would not want ecology as part of pathology's responsibility. Ecology is an extension beyond the pathologist's role in the curriculum. Also, we should not expand into the entire area of genetics just because we have an interest in the role of genetics in morbidity. We should encourage any department member who develops an interest in ecology or genetics, but not seek people with these interests just because we don't have them.

SUMMARY OF DISCUSSION WITH SOPHOMORE MEDICAL STUDENT GROUP
Washington, D. C.

February 27, 1969

Evaluation of case method teaching as experienced by this group.

The students liked being thrown into a case, having to grapple with the vocabulary and feeling their way. They considered this a scholastic enterprise, utilizing, expanding and integrating all of their accumulated information, as opposed to the receipt of revealed truth. They thought floundering about is important in that one has to learn first what one does not know and what one needs to know. They thought this approach should be started in the first year of medical school.

The students felt that this method of teaching involved more than tactics. They thought they had a better visualization of what happens in the tissues in disease. They felt they were learning at the expense of text-book reading and categorization of information. When they learned about a disease of an organ or system, they learned what happens throughout the body as a result of this disease. They were learning "clinical medicine with a bias toward pathology". They defined pathology as the study of disease as a whole; medicine as the study of a patient as a whole. They considered their experience entirely relevant to their medical education, although much of the relevance was assumed and taken on faith. They also felt this was an experience in form, relevant to all of their medical school experience and future practice. They emphasized the importance of their enthusiasm for their cases.

Relevance of pathology

The students felt that tactics and teaching methods are paramount and override content. They determine what a student will learn. Relevance will be determined by the individual student. Good teaching gives a student the tools that help him determine relevance. Students, however, are likely to assume relevance if teaching is good.

The students assumed that pathology had relevance to the study of medicine. They did not see how its ultimate importance could be evaluated, however, unless some students went through school without it.

The students thought there might well be a "core" of pathology knowledge that students need. This would include basic principles and vocabulary and terminology. Systemic pathology, however, should be elective.

The students thought clinicians should be consulted about the relevance of pathology to clinical work. There might conceivably be enough pathology in Harrison to obviate the need of a pathology course. They all agreed that the standard approach of "books and slides" did not seem relevant to the doctor-patient relationship and that categorized learning stifled inquiry.

AMERICAN ASSOCIATION OF CHAIRMEN OF MEDICAL SCHOOL DEPARTMENTS OF PATHOLOGY, INC.

COMMITTEE TO ASSESS THE TEACHING OF PATHOLOGY IN NEW MEDICAL SCHOOL CURRICULA

Report to Annual Meeting, March 9, 1969

In November 1968 the Committee received a contract in the amount of $6400 from the Bureau of Health Manpower, National Institutes of Health, to aid in its study of pathology teaching in the medical school curriculum. This contract will permit three meetings of the Committee in a one year period.

The Committee held its first meeting in Bethesda, January 29-30, 1969. Prior to these meetings, the chairman attended all four regional meetings of the Association and led discussions on pathology teaching. Abstracts of these discussions were prepared and distributed to the participants.

The Committee addressed itself to several problems at its first meeting. 1) It attempted to define the unique contributions of pathology and pathologists to medicine and medical education. 2) It attempted to define goals or sets of goals for pathology departments that can be flexible and adjusted to local situations. 3) It considered what pathology knowledge should be part of the background of every physician.

Several areas of tentative agreement among committee members emerged from the discussions.

The pathologist is best qualified to demonstrate the structural consequences of disease; this is his minimal contribution to medical education and he must be responsible for seeing this is done. He must, however, build from this base and develop levels of competence in the pathogenesis of structural change and its clinical implications. This is the integrative or "bridging" function of pathology that permits concise presentations to medical students that focus on the correlation of the basic sciences and the clinical disciplines. Pathology is the basic science that is unique to medicine.

To some extent, the pathologist serves a "generalist" role in realtion to student teaching, but he must also be seen as a contributor to medicine through advancement of knowledge and by continuous problem solving in the clinical setting.

The pathologist also brings to his teaching a unique point of view of disease. Not concerned with the over-all care of patients, he has opportunity (or is obliged to seek opportunity) for perspective and objectivity. His role as a monitor of medicine should be emphasized through teaching with other disciplines in the later years of medical education. It is his point of view of disease and the demonstration of the usefulness of structural concepts in the advancement of knowledge that give relevance to pathology in the medical curriculum.

The responsibilities and goals of pathology departments cannot be defined nationally. There is too much variation from school to school in the role pathology needs to play or can play. Our goals need to be flexible. Several committee members felt that pathology departments need to be large and diversified to meet the challenges of the curriculum. Small "quality" departments cannot have sufficient impact on medical education. Departments need to include people such as biochemists, physical chemists and biomathematicians who are experienced and oriented in the study of the anatomy of disease. We must attempt to match the growth of departments of medicine which now contain many experimental pathologists in very specialized areas who give students more sophisticated concepts of disease than we can. Departments of medicine want to teach "pathophysiology", but want to start at an advanced level. Other committee members felt that this sort of development of pathology departments was unlikely in many local situations, and that size alone might affect curricular time, but should not alter the basic role.

It was agreed that there is a core of pathology knowledge that should be part of the education of all medical students. This should be carefully defined and limited. There will be considerable variation from school to school, but all will overlap in the areas of general or basic pathology. Departments may approach the core subjects in very different ways, depending on specific areas of competence, and teaching can be departmental or interdepartmental. There was less agreement on a core of systemic pathology for all who recieve the M.D. degree. Most felt that this had to be limited to major systems, and that physicians had recall only for that information which is useful in particular careers. Some felt that the student had to be exposed to the totality of systemic pathology before being permitted to commit himself to a specific medical career. It was agreed that there is no longer such a person as an M.D., as there is no longer an engineer or a physicist. There was no agreement, however, as to whether the core curriculum should be the same for those who are to be teachers and investigators as for those who are going to provide medical care to society.

All pathology departments should be developing elective programs to supplement their core teaching. These should offer depth and breadth in pathology training, including clerkship and research experience. They should demonstrate our role as problem solvers in clinical medicine.

It was agreed that pathology departments should play a greater role in clinical pathology teaching. Our responsibility here is to help the medical student interpret laboratory findings and to correlate them with structural and clinical manifestations. This is a necessity if we are to teach pathology with its clinical implications. The contributions of clinical pathology to the study of the ecology of morbidity could best be demonstrated in elective opportunities.

Abner Golden, M.D.
Chairman

Note: Copies of the full abstract of the committee discussion are available on request. 3900 Reservoir Road, NW, Washington, D.C. 20007.

COMMITTEE TO ASSES THE TEACHING OF PATHOLOGY IN NEW MEDICAL SCHOOL CURRICULA

Meeting of March 10, 1969 - San Francisco, California
Summary of Discussion

Present: Golden, King, van Lancker, Morrison, Smith, Robbins

Absent: Benditt, Dawson, Stoddard

The committee first listened to portions of a recorded discussion by Ab Golden's special student group at Georgetown. The discussion concerned the relevance of pathology in medical education and methods of presenting the content of pathology.

Ab Golden indicated some disappointment that despite his clinical approach, the students were still relatively unaware of the role of pathology and the activities of pathologists in a university medical center. Stan Robbins thought the students were not sure why they were studying pathology. Few of them had a concept of our attempt to present an approach to an understanding of disease. They did not understand the use of structure as a basis for understanding clinical medicine. The students seemed still unsure of the relevance of pathology to the care of the patient in the bed. He felt also that they were failing to ask "why?" when considering structural changes. Dave Smith thought the discussion was a reiteration of the students' clinical orientation. They had no feeling of gaining knowledge for its own sake. He wondered if we have an obligation to try to divert their attitude from a single-minded clinical goal.

Stan Robbins thought that nothing had changed in the past 25 years. The first two years of medical school have always been grim. Today's students are more vocal, but we should not expect an interest in knowledge for its own sake. He later stated that students are different today in that they are more aware and more people-oriented. They are a lot more concerned with the world around them than we were 25 years ago.

Don King stated that students will hate whatever courses we give, unless we design our courses specifically for popularity. This is an age of protest. We should stand firm and do what we think is good for the future of pathology and medicine.

Archie Morrison thought we are much too concerned about teaching and what's in the curriculum. Julien van Lancker felt that the rate of conversion of teaching to learning was limited primarily by student factors, not by the faculty or the curriculum. He also took exception to the statement of one of the students and felt there is a need to learn classifications and categorizations of disease in a systematic way.

Stan Robbins thought we had been saying three things. 1) We know better than the students what they should know. 2) Any tactics are going to lead to protest. 3) Methods of teaching are unrelated to the transmission of substantive content. He felt that there are methods of capturing student imagination, but that these are determined by the personalities of individual faculty members. Archie Morrison added that students can learn pathology without professors and without a pathology course and that, in effect, they learn pathology despite us.

Dave Smith stated that he came away from the Bethesda meeting with a strong conviction that general pathology is part of a complex in the curriculum related to microbiology and biochemistry and physiology, and that systemic pathology was almost a separable complex more related to the clinical departments.

Don King asked for a definition of the goals of this committee. He suggested we conduct a survey to see what curricular changes are being made. Approximately 40 schools have changed their curricula. He would like to know the number of lectures, number of hours of laboratory (gross and microscopic), numbers of teachers, seminars, electives, etc. in these new programs. He thought we should also try to get some information on what students know when they start pathology and a means of evaluating what they have learned. The idea of conducting a survey was not greeted with universal enthusiasm.

Stan Robbins wondered if we are concerned with tactics and methods of teaching, or with broad concepts of changes in substantive content of pathology that should be part of the basic curriculum. Ab Golden stated that our government contract calls for an attempt to define a "core" curriculum for pathology.

Stan Robbins referred to our agreement at Bethesda that general pathology was "core" but that we could not agree on a place for systemic pathology in the core. (Don King inserted that the core at Columbia is a survey course that lasts three weeks and includes 18 lectures and 10 laboratory periods. Two days are devoted to general pathology, the rest to systemic.) Stan Robbins thought we need to teach less in the core and to provide extensive elective opportunities. This is why he is writing a shorter book. His book will be more arbitrary in approach and go considerably less in depth.

Dave Smith stated again that the core could be a group of good experiences in pathology. We should worry less about lists of content than quality of experience.

Ab Golden referred to the students' suggestion that we should discuss the relevance of pathology with clinicians. The group thought this would be worthwhile.

Discussion turned to plans for our next meeting, to be held in June or July. Stan Robbins suggested that each committee member define a core program and spell out what he thinks is needed in time to implement it. He felt we should set a deadline for the submission of a core or survey program. They should be sent to Ab Golden who will send them to all members of the committee one month before our next meeting. These programs should be in outline form, and three to five pages in length. At our next meeting, all should be prepared to criticize all of the programs in the hope of creating a synthesis. Ab Golden is to offer some general guidelines for the preparation of these programs.

Don King asked if we need also to indicate areas of popularity or methods of teaching that create popularity. Most committee members felt we should not deal with methods. Each department has to decide for itself on the basis of its strengths.

The following steps will be taken prior to our next meeting:

1. Each committee member will prepare a core or survey program, indicating the time necessary for implementation. These will be sent to all members.

2. Ab Golden will attempt to arrange a discussion with professors of clinical departments concerning their concepts of pathology teaching.

3. Ab Golden will attempt to get some feedback from junior and senior students as to what they got from pathology, what they would like to have gotten, what were its strengths and weaknesses.

4. Dave Smith will keep us apprised of whatever information of help that is forthcoming from the National Board of Medical Examiners.

5. Don King is to send a copy of his 35 page syllabus to all members of the committee.

6. Don King may conduct a survey of current curricular changes on his own.

SUMMARY OF DISCUSSION WITH PROFESSORS OF MEDICINE

Atlantic City, May 2, 1969

Present: Philip K. Bondy (Yale), Alexander Leaf (Harvard), Jack D. Myers (Pittsburgh), Walter Sheldon (Hopkins) and Abner Golden (Georgetown).

The group was asked to consider the role of Pathology in the education of the medical student.

Phil Bondy opened discussion by pointing out that pathology provides a service (diagnostic) and that students should be aware of how pathologists perform this service. This, however, often seems to be the major teaching thrust of pathology departments. Most pathologists are too tied to morphologic description of disease. Much more emphasis needs to be placed on combining the service function with a consideration of pathobiology and pathobiochemistry. Pathology departments must have the ability to discuss abnormal function and to correlate it with abnormal anatomy. They should perhaps also be able to correlate abnormal function in the physiological sense with the clinical picture of abnormal function. Thus, pathology acts as a bridge subject between the basic sciences and the clinical disciplines. The basic sciences have been moving farther and farther away from clinical orientation. Pathology and pharmacology can serve as bridges to clinical medicine.

Jack Myers stated that pathology has an extremely strong base from which to depart, but that the approach must always be dynamic, not static. He felt that many pathologists are too bogged down in routines and set procedures without regard to what is important and unimportant. He also thought pathologists have dropped the ball by not using the gross autopsy as a major teaching tool. Pathology departments have too many non-pathologists who don't really understand disease.

Phil Bondy felt that pathologists (particularly as seen at CPCs) tend to dwell at too much length on details of microscopic morphology, pre-empting the time of those prepared to discuss function. This has isolated pathology departments from clinicians. Another problem is that pathologists often try to "second guess" the clinician and to point out errors that are of little significance to teaching.

Alex Leaf stated that we all want to understand normal and abnormal function and the nature of disease. We need to know the morphologic basis of abnormal function. Students must be exposed to structure and function at the same time, and not regard morphology as an end in itself. The Pathophysiology course at Harvard accomplishes this. Those pathologists who make the greatest contribution in teaching are those who are interested in the functional consequences of altered structure. Participating faculty members from all disciplines attend all lectures and gain from the experience. Teaching in this way helps them keep up to date.

Phil Bondy thought it was very useful when pathologists became part of teams studying particular organs or systems. Students, however, do not tend to see this team role.

Alex Leaf said that the teaching at Harvard uses the team approach and this is terribly exciting to faculty and students. In this teaching the pathologist knows and demonstrates the morphology. The pathologist needs to teach the morphologic basis of disease together with other people who are trying to understand disturbed function.

Phil Bondy repeated that the service aspect of pathology has tremendous importance, but that students don't need these skills. Research activity, however, affects teaching ability, the exact nature of research being unimportant. Pathology has become isolated by publishing in pathology journals that do not have stature. What is needed of pathology, and what it should teach, is a connecting argument between cell biology, biochemistry, morphology and the disease process, put together in a rational functional pattern for the medical student. Alex Leaf thought pathology should not do all of these; much should be done by clinicians, physiologists, and biochemists. The pathologist is unique because of his detailed information concerning morphology. If he could do what Phil Bondy outlined, we would not need internists, physiologists, etc. Phil Bondy replied that pathology departments should include people who are at least comfortable at the "margins" of biochemistry, physiology, etc., particularly in research. The pathologist stands in the middle and other disciplines weave a picture around him while he holds the ends together. Pathology needs to supply a rapprochement between molecular biology and the sick patient. (This is done by several bridge subjects of which pathology is one). Some large departments of pathology could handle the entire bridge, others could lead and use people from other disciplines.

Alex Leaf thought that a pathology course (that which is completely under control of a pathology department) should be restricted to general principles. Organ and system teaching requires participation of other disciplines, despite the importance of pathology. Phil Bondy added that general pathology also includes very complex areas that may well need contributions from other disciplines. Walter Sheldon pointed to the Hopkins approach of starting with case problems and then returning to general principles. He pointed out that general pathology requires greater experience and knowledge for effective teaching. Phil Bondy thought this approach would make it easier to bring in experts from other disciplines who were interested in patients.

Ab Golden asked if there was relevance to morphology other than as a bridge and if the bridge could be discarded once crossed. Alex Leaf replied that each functional disturbance has its morphological counterpart. For this reason an ultimate complete explanation of a disease process will have to be described in both functional and morphological terms, hence he can't foresee that morphology can ever be discarded if we are seeking understanding of bodily functions whether normal or diseased. He hoped students would always base their understanding of disease on both function and structure.

Jack Myers pointed to the opportunity for pathology and internal medicine to work together on an introduction to clinical medicine which incorporates morphology and pathophysiology and really presents concepts of mechanisms of disease. Walter Sheldon agreed that pathology has a unique opportunity — as part of medicine; taking its guidelines and attitudes from disease — to present students with an introduction to medicine. All good pathology departments have attempted to give an introduction to medicine and to keep abreast of what this means. He stated that the strength of American pathology has always been its clinical orientation. He pointed further to the special opportunity (and ability) of pathologists in teaching medicine for analysis and synthesis based on a sound scientific foundation. There is something in the work of the pathologist that permits him to look at things in an over-all analytical way and give him something special to offer in teaching. Alex Leaf thought this was perhaps due to the fact that the pathologist sees disease in only one stage, rather than in its evolution. He felt that some in medicine have a knack for visual imagery. Others deal with concepts and have trouble with what they see. This emphasizes the need for a joint approach in teaching students.

Phil Bondy pointed out that we have been discussing pathology as a morphologic discipline. Some pathologists feel this is a very narrow approach to pathology. Alex Leaf thought pathologists are people who are interested in the nature of disease processes and who have monopolized the morphologic approach to the study of disease. Phil Bondy agreed that whatever other tools a pathologist uses, he also uses morphologic tools. Some pathologists, however, feel that in teaching, little time should be devoted to morphology.

Walter Sheldon emphasized that pathology is one of the significant branches of medicine which derives its stimulus and reason for existence from the fact that people are sick. The problems to be investigated are directly derived from this. One must above all be aware and conscious of the unfolding manifestations of disease. A person who calls himself a pathologist must be aware of the morphologic manifestations of disease.

Jack Myers stated that pathologists have a remarkable opportunity for teaching students. Students arrive hungry for an introduction to medicine. Ab Golden wondered if this would be true if students took medicine before pathology. Alex Leaf stated that what comes first in the curriculum is not relevant today. We are all interested in as complete as possible an understanding of disease. The internist must be aware of the role of pathology; otherwise, students will fail to see its relevance.

Jack Myers commented on the involvement of pathology departments in clinical pathology. He felt that the financial rewards of clinical pathology have influenced pathology departments adversely in their academic endeavor. Many departments of pathology are in trouble because of this. (It was pointed out that some departments depend on the income from the clinical laboratories for their very existence as academic departments).

COMMITTEE TO ASSESS THE TEACHING OF PATHOLOGY IN NEW MEDICAL SCHOOL CURRICULA

Meeting of September 27, 1969, Bethesda, Maryland

Abstract of Discussion

Present: Benditt, Golden, van Lancker, Morrison, Smith, Stoddard

Absent: Dawson, King, Robbins

The meeting was called to order at 9:40 AM.

Lee Stoddard suggested that the proposal submitted by Dave Smith be used as the basis for our report (he was referring to the first three pages of Dave Smith's proposal). He specified that no single curriculum be endorsed, but that we agree on objectives and that a group of exhibits be attached which would display different ways in which objectives can be attained. More than one mix of objectives should be presented. Ab Golden pointed to certain differences in objectives that were related to specific curricula in specific schools. Lee Stoddard thought we should each yield as much as possible in order to come to agreement on at least certain objectives; these should be broad but not platitudinous. He thought we need to agree on a "core" of objectives. Ab Golden thought we had accomplished at least some of this at our first meeting in January, 1969. He also pointed out that we tend to adjust our objectives on the basis of what we have accomplished. For example, his students feel that their principal accomplishment is the preparation to see their first patient, and that they are prepared to consider the patient as a whole. These apparent accomplishments are easily adopted as objectives.

Dave Smith thought students need the opportunity to manipulate their knowledge rather than attempting to cover the waterfront. This is a minimum or core experience that at least some of us seem to agree on. For some others, a group of topics (such as the lecture courses of Don King) seem to constitute a core. It is important to make a distinction between these two images of core. Lee Stoddard thought our report should emphasize this and that the exhibits should demonstrate different mixes of content and experience, and perhaps point out that sooner or later both content and experience are likely to be part of every student's education. Dave Smith thought we should not come out totally committed to the case study. What we want is a participatory laboratory experience. Ab Golden agreed and thought that many faculty members who are good teachers cannot use the case method and may do much better in presenting categorized content. Some students also have difficulty in learning from the case study. Dave Smith noted considerable differences in the way several of us use the case study method.

Lee Stoddard thought that one of our general objectives should be that we favor strongly the concept that an identifiable body of instruction be given by an identifiable department of pathology. This is an objective we should be able to agree on. Our common objectives should permit markedly different attitudes and practices as regards content, from the point of view that content is of little concern to one that content is almost everything. (Ab Golden noted that adaquate content follows almost inevitably, regardless of the randomness of approach).

Dave Smith thought we would have to be careful not to be accused of assuming a posture of defending pathology simply because it is pathology. We must justify the objective stated above in the face of mounting pressure for integrated teaching.

Ab Golden referred to his discussion with professors of medicine on May 2, 1969. He indicated disappointment. The discussion of the role of pathology had been clear and concise but this was perhaps easier for the professors of medicine than for us because they did not appear to accept pathology as part of medicine. Basically, they wanted us to just demonstrate morphology and to do it briefly so that they could discuss function. He felt that we need to give students an identifiable experience in pathology because we conceive of our role in medicine as being more than the demonstration of altered structure. Some students feel that we discuss altered function in more understandable terms than departments of medicine.

Archie Morrison added that perhaps we know better than those in medicine the stage of development of our students.

Lee Stoddard referred to George Engel's article "The Care and Feeding of the Faculty". He thought pathology is one of the essential new languages that every student has to become familiar with. This could be a solid foundation on which to build a case for an identifiable experience under the direction of pathologists. Lee Stoddard suggested that the pathologist is perhaps the last "home room teacher". Dave Smith added that it is the home room teacher who must handle the transition to no longer needing or wanting a home room teacher.

Ab Golden referred to the discussion of the Western group last December in which the pathologist was discussed as a "generalist". Medicine has become very fragmented, and many students feel we give more of a total view of the patient.

Dave Smith asked why we are best qualified to present the language of disease. Archie Morrison thought clinicians are unable to present morphology. Dave Smith reminded the group of our earlier discussion of the monitoring function of pathology and the detachment (or objectivity) of the pathologists' viewpoint that should be presented to students.

Julian van Lancker emphasized that many of the prevailing concepts of pathology _must_ be presented by a department of pathology. They do not come across in integrated teaching. Lee Stoddard added that the _language_ of pathology must be presented by departments of pathology. (Inflammation is part of the language of pathology).

Julian van Lancker felt that integrated teaching does eliminate some duplication and may also shorten the time of the curriculum. But the real problem of integrated teaching is that the faculty cannot really integrate different disciplines to the extent that students can. He thought, also, that relatively few disorders lend themselves to thorough integrated teaching.

Earl Benditt thought that we need to teach modern human biology. We cannot defend the maintenance of pathology, physiology, biochemistry or even internal medicine as departments. It was suggested that Earl write his concept of a modern human biology course as an additional exhibit for our report. Earl also thought that we need to minimize didactic presentations and enlarge those techniques which involve student participation as the basis for a learning experience. Lee Stoddard added that participation should imply responsibility as well.

Discussion turned to the writing of our report. Archie Morrison suggested that there be a short summary prologue. Dave Smith thought this summary could be brief as we are subscribing to relatively few principles.

Lee Stoddard thought we should attempt to name broad role-objectives. He suggested: 1) to introduce the students to a new language--the vocabulary of disease; 2) to do this through an integrated experience with a group of persons who are pathologists; 3) that the pathologist is in the peculiar position to be a monitor and can allow himself a degree of objectivity unique among the branches of medicine; 4) the home room teacher idea; 5) the pathologist is the repository of structural knowledge. The carrying out of these role-objectives in medical school education can be done in a variety of disparate ways, and these can be combined and are not mutually exclusive. The mixture can be carried out within the pathology department or in integrated activities of pathologists with many others, but at least the initial experience should be within the department of pathology. There will be a group of secondary objectives, those that reflect the individual pathology department and the individual school and curriculum. To attain these secondary objectives, there will be many different approaches and methods, as different as case teaching, lectures, slides, experiments, etc.

Dave Smith thought that most people looking for concepts of core curriculum deal with the secondary objectives and don't want to consider the primary role-objectives. It is going to be difficult to present the primary "generalities" in a way that will have meaning and be acceptable.

Lee Stoddard added that the exhibits will set forth groups of secondary objectives and ways of getting to them.

Discussion turned next to National Boards. Dave Smith referred to the problems of choice of content for the pathology examination. In the recent relevance study of Part I, about 60% of pathology questions were rated both relevant to pathology teaching and part of core. (This was the highest percentage of the basic science subjects). Very few questions were rated neither relevant nor core. Dave Smith concluded that there is no specific content to core.

Lee Stoddard thought the National Board Examination could be used to support the notion that a diversity of teaching methods and secondary objectives can produce a satisfactory product and can satisfy the primary objectives. It was pointed out that time must be available in the curriculum for text-book reading, as most National Board questions are "book" questions. Free time must be protected for our students, particularly as we develop core courses.

Lee Stoddard asked if our report should take congnizance of National Board Examinations and their relationship to the place of pathology teaching in the curriculum. Dave Smith thought that the National Board seems to be in contact with a common concept of content.

Lee Stoddard proposed that we should treat of the problem of National Boards, as they are a reality, and that we should include a clear statement of how National Boards can and do relate to our role-objectives. He suggested that National Boards relate to the measurement of a satisfactory acquisition of a basic language, the vocabulary of disease. He thought we should also state the dangers of the National Boards, and that we call upon the National Board to come more into the open; that the examinations be available to all professors of pathology and through them be made available to all students. Archie Morrison suggested that the National Board would have to publish a syllabus of what students should know.

Dave Smith thought we would not want to be dictated to by the National Board as to the content of pathology. Dave Smith also pointed out that many questions need to be used several times and this would make it difficult to have them available to all students.

Ab Golden suggested that we recommend that time must be available in the curriculum for students to prepare themselves for the National Boards.
Lee Stoddard still wanted a syllabus to be prepared; something more than the present categories supplied to all applicants. Ab Golden questioned if we wanted the National Board to define a core content of pathology to be taught, especially as our committee abhors the idea of defining core content. The more detailed the syllabus, the more dangerous.

Lee Stoddard repeated that we need a statement of the relevance of the National Boards to our role-objectives, and that this relationship was that of a standard for evaluating sufficient acquisition of this new basic language—the vocabulary of disease. It was suggested that the National Board has the responsibility to be aware of how pathology is being taught.

Earl Benditt thought National Boards should define a minimum standard and should be graded pass-fail, with no ranking. The examination should not be used to evaluate new curricula. He thought that a syllabus would set the core curriculum.

Lee Stoddard insisted that we should say what National Boards is related to, not what is is not related to.

Ab Golden anticipated frustration in an attempt to satisfy all with a statement concerning National Boards.

Lee Stoddard referred again to the exhibit portion of our report. He thought that all of the exhibits represented initial surveys for introductory periods. In that of Stan Robbins, the point of the survey is content. In that of Ab Golden, the point of the survey is experience. We need to emphasize the role of electives as supplements to all of the core programs.

Ab Golden thought that the exhibits should not be identified as to their origin. All agreed. It was also agreed that the exhibits already on hand are a sufficient group of examples and that we should not solicit others.

The meeting adjourned at 4:00 PM.

SAMPLE CORE PATHOLOGY COURSES

CORE PATHOLOGY COURSE
#1

The material covered in this syllabus is lecture teaching and should be correlated with the study of either fresh or illustrated case material. If 55 hours of case study are assigned with this lecture syllabus, a total course offering 100 hours is outlined.

Inflammation. The nature of the inflammatory response to injury, the vascular reaction, the cellular reaction, the biochemical and hematological reactions. The suppurative response, the formation of the abscess, the evolution of the abscess, abscesses in special sites, the lung, the skin, the nervous system. Teaching time, 1 hour.

Vascular changes in inflammation. Permeability of vessels, particularly venules, ultrastructure of vessels in relation to inflammation; phagocytosis, chemotaxis, effects of histamine, serotonin, etc. on inflammatory response. Teaching time, 1 hour.

Repair. Incised wound, role of the histiocyte, the fibroblast, formation of collagen, healing of abscess with granulation tissue and stages of healing, scar formation, universality of this process illustrated by chronic pyelonephritis, peptic ulceration with pyloric stenosis, ulcerative colitis with chronic fibrosis of colon. Teaching time, 1 hour.

Circulatory factors in disease. Active and passive hyperemia; hemmorhage; local response to hemorrhage and generalized response to hemorrhage; thrombosis and blood clotting. Teaching time, 1 hour.

The nature of edema recall the importance of intracellular and extracellular fluid, the role of sodium in edema formation, cardiac edema, renal edema, the interplay of the adrenal and the posterior pituitary in sodium and water control; the breakdown in the mechanisms illustrated by diabetes insipidus, Cushing syndrome, localized edema as in acute left ventricular failure with pulmonary edema. Teaching time, 1 hour.

Congenital Heart Disease. outline anatomic abnormality and functional effects of Tetralogy of Fallot, patent ductus, and coarctation of the aorta, the interventricular and interatrial septal defects. Subacute bacterial endocarditis in rheumatic heart disease and congenital heart disease. Teaching time, 1 hour.

Injuries from specific organisms. The pyogenic bacteria and their role in bronchopneumonia, meningitis, osteomyelitis. Gram negative bacteria, their endotoxins. Teaching time, 1 hour.

Tubercle bacillus. The primary and secondary response to it, granulomatous response to the tubercle bacillus, pulmonary tuberculosis, Ghon focus, cavitation, hilar lymph node tuberculosis, miliary tuberculosis, central nervous system tuberculosis and meningitis, intestinal tuberculosis and bone tuberculosis. Teaching time, 1 hour.

The granulomatous response in fungal diseases, response to the spirochaete. Changing disease pattern of syphillis, review tissue response to parasites. Teaching time, 1 hour.

Genetic factors in disease. Review nature of DNA as the basis of heredity, transmission of the genetic message, the concept of gene defect and enzyme deletion leading to inborn errors of metabolism, choose one error and analyze it in detail. Brief review of cytogenetics and correlation with mongolism and Klinefelter syndrome. Teaching time, 1 hour.

Immunopathology. The site of antibody production, the role of the lymphocyte in delayed hypersensitivity, distinguish clearly circulating antibodies from the delayed response, illustrations, diptheria, and the tuberculin test. Use cases. Teaching time, 1 hour.

Effect of ionizing radiation on cells. The tissue response to ionizing radiation, the target theory, free radical concept, effects of radiation in man on the hemopoietic system, gonads, gastrointestinal epithelium; long term effects, appearance of leukemia, possible genetic effects. Teaching time, 1 hour.

Oncology. Abnormal cell growth, hypertrophy, hyperplasia, the role of the nucleic acids, control of hypertrophy and hyperplasia and the nature of the neoplasm. Benign and malignant tumors. Teaching time, 1 hour.

Classification of tumors. Outline main histological types of tumors; their biological behavior and the end result for the patient. Teaching time, 1 hour.

Nature of carcinogenesis. Cancer, mule spinners cancer, the isolation of the aromatic hydrocarbons. Viral carcinogens, the mechanism of carcinogenesis, initiation and promotion. Teaching time, 1 hour.

SYSTEMATIC PATHOLOGY

Cardiovascular system

1. Acute rheumatic fever, rheumatic pancarditis, the sequelae of rheumatic fever, congestive cardiac failure. Teaching time, 1 hour.

2. Myocardial infarction, acute pulmonary edema, repair, cardiac fibrosis, myocardial aneurysm formation, ruptured myocardium. Aortic aneurysms; syphillitic, arteriosclerotic, dissecting. Teaching time, 1 hour.

Delayed hypersensitivity. The features of transplantation immunity, the concept of autoimmunization and autoantibodies, illustrative disease processes, acute glomerulonephritis, glomerular localization of antibody, tuberculosis with the hypersensitivity response, Hashimoto's disease. Teaching time, 1 hour.

Respiratory system. Bronchopneumonia, lobar pneumonia, chronic bronchitis, emphysema. Cor pulmonale and functional effects of cor pulmonale, respiratory acidosis. Teaching time, 1 hour.

Bronchogenic carcinoma, main types. Natural history, biological behavior other tumors of lung, lobular collapse, and bronchiectasis. Teaching time, 1 hour.

Pneumoconiosis. Fibrosis of the lung, pulmonary function studies, concept of compliance and diminished reserve. Teaching time, 1 hour.

Urinary system. Glomerulonephritis, acute and subacute and chronic glomerulonephritis. The nephrotic syndrome, nature of the syndrome, review edema and role of sodium in water retention. Teaching time, 1 hour.

Acute and chronic pyelonephritis. Role of organisms. The vascular diseases of the kidney, the collagen diseases. Teaching time, 1 hour.

Acute and chronic renal failure. Nature of uremia, the defect of renal function in chronic renal disease, concentrating and diluting defects, failure of acid excretion, proteinuria and hematuria. Teaching time, 1 hour.

Metabolic acidosis. Review blood pH control, nature of base deficit in metabolic acidosis. Return to respiratory acidosis. Teaching time, 1 hour.

Gastrointestinal tract. The nature of peptic ulceration, effects, complications, and sequelae. Carcinoma of the stomach, carcinoma of the large bowel, biological behavior and natural history. Ulcerative colitis. Teaching time, 1 hour.

Disease of the pancreas. Carcinoma of the head of the pancreas, the effects of pancreatic deficiency, steatorrhea, and the malabsorption syndromes, celiac disease. Teaching time, 1 hour.

Liver. Cirrhosis and scarring of the liver, results of different injuries biliary obstruction alcoholic and or nutritional damage, viral injury of the liver cells. The effects of cirrhosis on portal circulation and on metabolic functions of liver. Teaching time, 1 hour.

Liver function. Disturbance of metabolism of bilirubin in cirrhosis, and in biliary obstructive jaundice. Differentiation of obstructive from hemolytic jaundice. Teaching time, 1 hour.

Hematopoietic system, anemia, iron deficiency anemia, the macrocytic anemias, hemolytic anemias, aplastic anemia, polycythemia vera. Teaching time, 1 hour.

The nature of leukemia, acute and chronic leukemia, the lymphomas, lymphosarcoma. Teaching time, 1 hour.

Multiple myeloma, the bleeding disorders. Teaching time, 1 hour.

Review tumors of the breast, carcinoma of the breast, fibroadenomas, tumors of the uterus, cervical carcinoma. Carcinoma in situ. Carcinoma of the body of the uterus. Classify tumors of the ovary. Teaching time, 1 hour.

Disorders of implantation, ruptured ectopic pregnancy, gonorrhea, salpingitis, postpartem infections, endometriosis. Teaching time 1 hour.

Benign prostatic hypertrophy, carcinoma of the prostate, obstructive uropathy. Teaching time, 1 hour.

Central Nervous System. An expanding lesion of central nervous system, general effects, papilledema, raised cerebral spinal fluid pressure, herniation on lumbar puncture; mention main expanding lesions briefly, tumors, abscesses, hemorrhages. Teaching time, 1 hour.

Tumors of the nervous system, the gliomata, brief classification, biological behavior, tumors of the pituitary, cerebellar pontine angle, secondary tumors of the brain, the use of localizing signs. Teaching time, 1 hour.

Meningitis, tuberculoma, encephalitis, the demyelinating diseases, immunity. Teaching time, 1 hour.

Strokes. The infarct, the hemorrhage, thrombosis, embolism. The natural history of the large and small stroke, subarachnoid hemorrhage, the berry aneurysm.Teaching time, 1 hour.

Review anatomy of the long tracts of the spinal cord, long tract disease, posterior column disease, lateral column disease, subacute combined degeneration, the upper motor neuron lesion, the lower motor neuron lesion, and their effects. Teaching time, 1 hour.

Coordinating topics. Hypertension, concept of essential hypertension, renal dependent hypertension, endocrine hypertension, possible mechanisms of renal hypertension. The long term effects of hypertension, arteriolosclerosis; its effect on the eye, the brain, the kidney, the small vessels generally. The role of hypertension in the development of arteriosclerosis. Teaching time, 1 hour.

Diabetes mellitus. The inate metabolic defect, the role of carbohydrate in lipid metabolism. The natural history of diabetes, both juvenile onset and middle age diabetes. The complications of diabetes, arteriosclerosis, renal disease, retinal disease. Teaching time, 1 hour.

Endocrine system. Disorders of the parathyroid, primary and secondary hyperparathyroidism, parathyroid tumor, effect on the bone, delineation of metabolic types of bone disease, osteomalacia, osteitis fibrosa and osteoporosis; osteosclerosis. Teaching time, 1 hour.

Adrenal disease. Cushing syndrome, review of gluconeogenesis, effect on protein metabolism, effect on skin, bones, cardiovascular system, the electrolyte and water defects, Addison's syndrome and hyperaldosteronism. Teaching time, 1 hour.

Throid disorders. Hyperthroidism, myxedema, the sclerotic diseases of the thyroid, relation to autoimmunity, islet cell tumors, peptic ulceration and diarrhea, carcinoid syndrome.

CORE PATHOLOGY COURSE

#2

I Objectives

To approach pathology through the intensive study of a group of patients who have come to autopsy, a group of problem-solving experiences that deal with basic bodily responses to injury and with the major systems as their disorders effect the entire biologic unit. To give emphasis to the usefulness of studying altered structure as a means to understanding the pathogenesis and the physiologic consequences of disease. To acquaint students with the basic vocabulary of medicine. To develop a close relationship between students and faculty through participation in a joint learning experience.

II Course Design

Students are organized into groups of six with one faculty member (and, if possible, a house officer) assigned to each group.

One patient is studied each week during the course. The student receives a protocol that includes the clinical history, physical examination, laboratory data, hospital course and the gross autopsy findings. Each student receives his own set of the pertinent histologic preparations. Students work independently on this material, coming to grips with the major problems presented and pursuing facets of individual interest. The group meets with its instructor for one two-hour session each week and reviews the findings and their interpretation. Photographs of the gross organs are projected, as are photomicrographs of the major histologic findings. The first few discussions are directed somewhat systematically by the faculty member, emphasizing the approach to the case study and pointing to the basic principles illustrated. Students are then given the major role, being asked to summarize and correlate the data. Each student also "leads" one or two group sessions, using techniques of his choosing.

An estimated 15-20% of the discussion time deals with "general" pathology. Greater emphasis is placed on histopathology than gross pathology because of the material available to the students.

There are no lectures and no formal laboratory periods. Students, however, are encouraged to visit the autopsy room and to assist in autopsies if they desire.

III Course Outline

The course consistsof approximately twenty-two case studies. Several examples of the case material and its usefulness in teaching are appended (VI).

IV Time

Total curriculum time required: 45 hours.

Faculty members spend at least two hours preparing for each group session. This does not include time needed to prepare protocols, select sections, take photomicrographs.

Students average about four hours in preparation for each case study. The early cases take much longer.

"Free" curricular time is considered essential to the success of this type of program.

V Evaluation

This method of teaching capitalizes on the students' interest in clinical medicine and illustrates how an understanding of pathology pertains to the care of patients. They immediately feel the relevance of this course to their medical education, and mature rapidly in their ability to evaluate and integrate scientific data in a logical manner. They learn to understand the course of illness in the individual patient and to correlate the structural and functional manifestations of disease. Emphasis falls naturally on the major problems of medicine and how disease affects the entire organism.

This is an enjoyable experience for the students who feel they are participating with the faculty in problem-solving situations. A non-competitive atmosphere prevails. Students also develop an intense interest in histopathology, feeling that functional disturbances must have anatomic correlates. Much clinical pathology is incorporated in this course.

A core of pathology is synthesized by each student for himself. The course emphasizes independent study and aids students to develop competence to teach each other.

Not all faculty members have sufficient clinical background or interest to teach effectively by this method, and some students may not have sufficient educational maturity to assume so great a responsibility for their own education. The selection of case material may leave some broad gaps in the student's experience in pathology, gaps he may feel compelled to fill by textbook reading. Finally, the case material must be constantly reworked and updated if it is to serve its function.

VI Sample Cases

Case 1

A 58 year old man with a three week history of progressively severe angina pectoris followed by acute myocardial infarction. Death in hospital on 4th day due to progressive congested heart failure.

Diagnoses: Acute myocardial infarction; coronary atherosclerosis, severe, with thrombosis left anterior descending branch; pulmonary edema and congestion; bilateral pleural effusion; passive visceral congestion; cholesterolosis and cholelithiasis.

Slides: Heart (2), coronary arteries (2), lung, liver.

Discussion: Manifestations of cellular and tissue necrosis; infarction; the acute inflammatory response; nature and consequences of atherosclerosis; relation of coronary artery disease to myocardial infarction; manifestations of congestive heart failure; evaluation of serum enzyme levels and blood volume studies.

Case 3

A 62 year old woman with a ten day illness characterized by chills followed by fever, diarrhea, anorexia, dehydration and progressive mental confusion. Moderate alcoholic history. Patient cyanotic, electrolyte-depleted. Pneumococci cultured from tracheal aspirate. Death thirty hours after admission despite antibiotics, intravenous fluids, tracheostomy and use of respirator.

Diagnoses: Lobar pneumonia, right upper and middle lobes; fatty metamorphosis of liver; acute splenitis; adenomatous polyps of colon.

Slides: Lung (3), spleen, liver, colon polyp, aorta, bone.

Discussion: Pathogenesis, healing and complications of lobar pneumonia; infectious disease as a reflection of host-parasite relationship; possible diabetes mellitus; basic observations on tumors (reproduction of structure and function, benign vs. malignant, classification); evaluation of serum electrolytes and blood gases.

Case 6

A 54 year old man with known hypogammaglobulinemia for six years. Frequent infections, the most recent associated with generalized rash, persistent vomiting and watery diarrhea, and severe electrolyte depletion. On steroids for two months for skin lesion diagnoses necrobiosis lipoidica diabeticorum. Elevated fasting blood sugars. Stool cultures: staphylococcus aureus. Treated with antibiotics and steroids. Episodes of chills, high fever and shock, with blood cultures positive for E. coli. Massive hemolysis with progressive icterus. Terminal cultures of blood, stool and urine positive for monilia.

Diagnoses: Hypogammaglobulinemia; systemic moniliasis, massive; pseudomembranous enterocolitis; acute pancreatitis; biliary stasis.

Slides: Heart (H&E and PAS), spleen, liver, esophagus, pancreas, adrenal, kidney (H&E and PAS).

Discussion: Causes of hypogammaglobulinemia; morphologic findings in diabetes mellitus; relationship of diabetes, steroids and antibiotics to monilial infection; general characteristics of fungus infections and role of antibodies in host defense; pathogenesis of pseudomembranous enterocolitis; gram negative sepsis; pathogenesis of acute pancreatitis; causes of icterus; alterations of host defense by steroids, antibiotics.

Case 12

A 35 year old woman with one year history of progressive cough, respiratory distress, lymphodenopathy, and dependent edema. Admitted following severe chills, fever. Patient in respiratory distress, cyanotic, edematous, hypotensive. Polycythemia, pyuria, azotemia, hyperuricemia, metabolic acidosis, hypercalcemia. Attempts to correct acidosis and congestive heartfailure unsuccessful; death in 48 hours.

Diagnoses: Sarcoidosis, involving lung, lymph nodes, liver; bronchiectasis and emphysema, marked; cor pulmonale; congestion of viscera; oxyphile adenoma, parathyroid; acute pyelonephritis.

Slides: Heart, lung (3), liver (2), adrenal, kidney, lymph node, parathyroid.

Discussion: Nature of sarcoidosis; pathogenesis of bronchiectasis and emphysema; disturbances of pulmonary function; systemic effects of chronic pulmonary disease; cor pulmonale; usefulness of liver biopsy; causes of hypercalcemia; pathogenesis of pyelonephritis; significance of oxyphile parathyroid adenoma.

Case 21

Students' protocol attached.

Diagnoses: Anaplastic bronchogenic carcinoma, with extensive metastasis; Cushing's syndrome, with adrenal cortical hyperplasia and Crooke's change in pituitary; active pulmonary tuberculosis; lipoid pneumonia; pulmonary infarcts.

Slides: Lung (5), lymph node, liver, pancreas, adrenal, pituitary (Pearse).

Discussion: Behavior of bronchogenic carcinomas; hormone production by tumors; manifestations of Cushing's syndrome; correlation of structure and function in the endocrine glands; effect of adrenal steroids on infections (tuberculosis) and skin tests (PPD).

CASE STUDY # 21
(67 A 135)

Present Illness: The patient, a 61 year old woman was admitted for evaluation of multiple skin nodules of three weeks duration. Her first symptoms appeared in November, 1966 when she noted nocturnaland morning cough productive of a small amount of whitish sputum. There was no fever, chest pain or dyspnea. She later noted the appearance of multiple small subcutaneous nodules, at first over the left upper abdominal quadrant. They were firm, non-tender and enlarged progressively. Three weeks before admission, she noted ankle edema and swelling of the face and experienced paroxsymal nocturnal dyspnea and orthopnea. Many more subcutaneous nodules appeared, varying in size from 0.5 to 2 cm., scattered over the neck and trunk. She complained of no other symptoms. Her appetite remained good and her weight was stable. Four days before admission, she spontaneously lost her voice. An x-ray examination taken prior to admission showed an infiltrate in the left upper lung field.

Past History: There was a history of pulmonary tuberculosis with hospitalization for 2 years in 1952 and 1953. Therapy included pneumothorax and oral anti-tubercular drugs. Therapy was discontinued following hospitalization and there were no apparent sequalae. The patient gave a history of smoking 2-3 packages of cigarettes per day for many years.

Family History: The patient's father died of carcinoma of the pharynx. One brother had a brain tumor.

PHYSICAL EXAMINATION

The patient was a thin alert and cooperative white female in no acute distress. She spoke with considerable hoarseness. The temperature was 98.6, pulse 96, respirations 20, blood pressure 160/90. There were multiple firm non-tender 0.5-2 cm. nodules over the trunk and cervical regions. There was also a palpable mass in the left breast. The head, ears, eyes, nose and throat were unremarkable. Examination of the heart revealed a systolic ejection murmur at the left sternal border radiating to the apex. The lung fields showed a few expiratory rales bilaterally and increased breath sounds in the right upper lung field. The liver was firm and non-tender and was palpable 4 cm. below the right costal margin. The spleen was not palpable. The genitalia were normal. A small nodule was palpable in the left posterior wall of the rectum. The extremities showed 4+ pitting edema of the ankles, but good pulses and no cyanosis. Neurological examination was unremarkable.

LABORATORY DATA

The urine specific gravity was 1.013, the pH 8. There was 2+ albuminuria, negative sugar and acetone. The sediment contained 15-20 white blood cells and 8-10 red blood cells per high power field. The blood hct. was 38%. The WBC count was 23,000 with 98% polymorphonuclear leukocytes. The platelet count was 500,000. A total eosinophil count was 34. The blood urea nitrogen was 15 mg%. The serum calcium was 10.2 mg%, the phosphorus 1.1. The blood CO_2 was 28 mM/l. The serum sodium was 140 mEq/l, chloride 98 and potassium 2.3. The LDH was 950, SGOT 10, SGPT 2. The serum alkaline phosphatase was 3 units. The blood sedimentation rate was 38 mm. in one hour. The PBI was 2.8 mcg/100 ml. Plasma cortisol levels were 105, 45 and 50 mcg/100 ml on three occasions. The total serum proteins were 5.3 gms. per 100 ml with 2.6 gms. albumin. Urine cultures were negative, but sputum cultures grew staph aureus coagulase positive and alpha strep.

X-ray examination of the chest showed a mass in the left hilar region associated with partial atelectasis of the left upper lobe. Calcification was noted associated with pleural scarring at the right apex. There was no evidence of bone destruction. Examination of the abdomen was unremarkable.

Biopsy of a subcutaneous nodule was reported as anaplastic carcinoma.

HOSPITAL COURSE
The patient developed progressively severe shortness of breath and had great difficulty in expectorating tracheal bronchial secretions. She developed a left pleural effusion. Tenting of the left diaphragm was noted and was thought to be secondary to phrenic nerve paralysis. She developed abdominal distension. In view of the widespread neoplastic process, no specific therapy was felt indicated. The patient died on the 16th hospital day.

GROSS AUTOPSY FINDINGS

The patient measured 64 inches in length and weighed an estimated 110 lbs. Multiple firm 0.5-1 cm. subcutaneous nodules were present over the neck, thorax and abdomen. There was marked enlargement of cervical lymph nodes. A firm 1 x 0.5 cm. mass was palpable in the left upper quadrant of the left breast. The abdomen was distended.

Serous cavities: The peritoneal cavity contained4,000 ml of serosanguineous fluid. Multiple enlarged mesenteric lymph nodes were noted. The left pleural cavity contained 400 ml of serous fluid, the right 100 ml. There were fibrous adhesions over both upper lobes. Marked enlargment of mediastinal lymph nodes was noted. The pericardial cavity was unremarkable.

Heart: The heart weighed 310 gms. The valves and chambers appeared normal. The left ventricle measured 2.0 cm. in thickness, the right 0.3. There was no significant atherosclerosis of the coronary vessels.

Lungs: The left lung weighed 600 gms, the right 600. Both apices were fibrotic and inactive granulomata were noted in the right apex. Pleural thickening and adhesions were present bilaterally. A mass was present in the central portion of the left upper lobe, measuring 2.5 x 2 x 1 cm. The distal portion of the upper lobe was firm and atelectatic. The main bronchus to the upper lobe was markedly compressed by the tumor mass. The lower trachea and both main stem bronchi were enveloped by masses of firm grey-white tumor tissue. Cut sections of both lungs revealed multiple small nodules of tumor tissue scattered throughout the upper lobes.

Spleen: Thespleen weighed 100 gms. and was grossly unremarkable.

Gastro-intestinal tract: The only significant finding was an elevated submucosal lesion measuring 0.5 cm. in diameter located in the distal ileum.

Pancreas: The pancreas was enlarged and firm and showed multiple small areas of fat necrosis over the surface. Cut section showed diffusely nodular greyish-white tissue infiltrating through the substance of the head, body and tail.

Liver: The liver weighed 1550 gms. Its overall architecture appeared normal but there were two small greyish-white parenchymal nodules noted in the left lobe. The gallbladder was normal in size but contained two small black stones. The extrahepatic bile ducts were unremarkable.

Adrenals: The left adrenal weighed 16 gms., the right 100. The right adrenal was markedly enlarged and adherent to the capsule of the kidney. Cut sections of this gland showed many nodules of greyish-white tumor tissue measuring up to 2 cm. in diameter. There was also extensive hemorrhage within the adrenal gland and in the periadrenal connective tissue. The left adrenal appeared markedly hyperplastic and was rich in lipid content.

Kidneys: The left kidney weighed 150 gms. , the right 170. These organs were unremarkable except for multiple small white nodules scattered through the cortex.

Female genitalia: No abnormal findings were noted.

Neck organs: The thyroid gland weighed 7 gms. and appeared grossly unremarkable. The parathyroid glands appeared normal.

Brain: The brain weighed 1240 gms. It was symmetrical and no lesions were encountered on section. The pituitary gland was grossly unremarkable.

CORE PATHOLOGY COURSE

#3

Objectives

The principal objective of a "core course" in pathology should be to introduce the student to the systematic study of human disease with particular display of altered structure as it results from the effedts of etiologic agents and as it results in altered function.

In designing and administering such a course, I propose to give the student sufficient opportunity to study a breadth of topics and sufficient experiences in dealing with individual topics that he can utilize his knowledge of pathology to continue his studies, especially in clinical medicine. Whether labeled pathology or by some other name, this requires, in my judgment, something more than 300 hours of the student's time.

Students who have completed this course should have acquired 1) sufficient practice in approaching the study of various topics that they can approach other new topics with the exercise of good judgment in seeking and evaluating relative information, and 2) a sufficient assortment of specific information relative to human diseases that they can be favorably compared to their peers among American medical students by some broad and generalized device such as a licensing examination.

These objectives do not differ in essence from those of the course I am now teaching, but I would expect specifics of courses to vary widely from school to school and time to time, depending upon the students, instructors, and facilities involved as well as relations to the remainder of the medical curriculum.

Strong points of this proposal are

1) The presentation to the student of a coordinated, rational, and somewhat (although admittedly incompletely) comprehensive program for the study of human disease without excessive fragmentation into restricted topics or single systems of disease. Hopefully much of this course would be taught by a single staff whose continued guidance of the students would add an important element of continuity.

2) The student would be actively and practically involved in manipulation of the materials utilized in the acquisition of knowledge, his own instruction, and the diagnosis of disease.

The weak point of this course, as of any other, consists of the variable effectiveness with which both instructor and student understand and accept its objectives and are willing to invest time and effort in their achievement. Practical dimensions of facilities and staffing are sufficiently flexible that they should constitute no great problems. Relations to other curricular approaches are also flexible,and a significant approach to the objectives of this course could be made as long as the principle of an identified disciplinary course in pathology was accepted and a minimum of probably as few as 60 class hours alloted to this program, although such a minimum would seem to approach the point at which expected returns might not justify the time and effort needed on the part of students and instructors.

General Description of Design of Course

This course will have the following essential parts or "Teaching Series."

1) A series of laboratory experiences that exercise the student in the recognition and evaluation of diseases. This unit is best accomplished by a case study method, but it might involve actual current autopsies under circumstance and facilities that are particularly favorable. It could be designed about problem solving experiments in experimental pathology, although I have not found any of my colleagues who have had great success with such a design.

2) A series of laboratory experiences that exercise the student in the technics of detection and measurement of the effects of disease. These exercises are related to the methods of clinical and experimental pathology and should be carefully chosen for their relevance and applicability to the students' future career and interests.

3) A series of lectures by which there is presented a coordinated and reasonabily comprehensive introduction to the manifestations of human disease. In this unit there should be represented segments of pathobiology, general pathology, clinical pathology, and special pathology as might be appropriate to the goals and relations of the particular course within a particular general curriculum and in a particular institution.

4) A series of class time units that can be utilized for seminars, special presentations in particular areas such as neuropathology, exercises with teaching machines, demonstrations,

and other appropriate devices that might be desired by faculty or students. The exact content of this unit, ideally, should probably vary from year to year dependent upon current interests of faculty and the availability of various resources.

5) A series of class time units more or less under the protection and control of those conducting this course in which the student may follow a recommended reading program that includes his text book, if one is assigned, and study such other materials as might be made available to him, such as collections of microscopic slides, exhibits, case reports, etc.

For a course in pathology immediately preceeding clinical work by the student, it is recommended that considerable emphasis be given to the utilization of gross pathology and clinical pathology as teaching approaches and less to microscopic anatomy. The latter will probably not again be a part of the experience of most students, yet it must be retained within the pathology course for it is the easiest and strongest link to the student's previous experience in cell biology. It is not considered that there is a great need to utilize much clinical medicine, per se, in teaching this course in pathology. Reference to clinical experiences and the clinical correlation of structural changes and laboratory determinations are, of course, essential, but the students' impatient desire to get on with clinical experience is usually neutralized by his interest and excitement in studying, at last, human disease.

It is conceived that the principles of this course might be applied with various proportions of the assigned time and effort falling under such topics as general pathology, systemic pathology, etc. Also, the amount of each such category that might appear in the various teaching approaches, such as the lectures, case studies, machine teaching, etc., would vary according to the interests and desires of the instructors involved. In my experience, I would consider a distribution of 30 per cent general pathology, 50 per cent systemic pathology, and 20 per cent clinical pathology a good balance, but these figures are meaningless without previous agreement on a description of the activities so classified. I suspect that others might accuse me of combining all three of these areas into the major teaching tool of case studies in such a manner that they could perhaps not be separately identified as class hours exclusively devoted to anything approaching the times indicated.

Time Requirements

As outlined, this full course occupies 336 hours of assigned time. It can be shortened, however, to fit the demands of a given institution; although, it is my concept that when such is done it consists essentially of shifting certain topics from this self-contained course to other teaching areas rather than their elimination from the curriculum. Such an arrangement may be dictated by the desire to utilize teaching talent in other departments and disciplines that will not affiliate with the outlined course, but it would seem desirable that the principle of such a comprehensive course be preserved even if its exclusive control has to be passed to others than the Department of Pathology. In certain instances changing its title from "Pathology" to "Mechanisms of Disease" seems to make it much more acceptible to clinical colleagues who will then contribute to the operation of the course.

If it is necessary that the time devoted to this course be shortened, or if a Department of Pathology is faced with conducting a "core course" in a shortened period of time, the scheduled time can be reduced by sacrificing, in whole or in part, the 5 essential parts, or Teaching Series, outlined in the second section of this presentation. These Teaching Series should be reduced in reverse of the order in which they are presented in Section 2. Choices regarding the degree to which any part is abandoned will, of course, depend upon what provisions there might be for similar educational experiences being offered the student elsewhere in the curriculum. It must be emphasized that when Teaching Series 5 (study periods) is sacrificed, it must reappear in the general curriculum to keep the latter from falling into the trap of creating a monster of assigned time and activity that eliminates all opportunity for study and contemplation. Some schools are known to have experienced this unpleasant condition.

From my experience and concept of the unique contributions of pathologists as teachers, I would recommend that Teaching Series 1, the exercises in recognition and evaluation of disease (case studies) be the last sacrificed. With sufficient staff and proper arrangements this can be done within less than the 60 hours mentioned as a possible bare minimum. If a faculty is not willing to assign this amount of time to a course called "Pathology," it would seem futile to try to preserve at all the disciplinary contribution of pathologists to undergraduate medical education.

LECTURES FOR CORE COURSE

#3

1. Introduction to Pathology
2. The nature and investigation of disease
3. Cellular basis of disease, genetics
4. Principles of general pathology
5. Principles of neoplastic disease
6. Principles of circulatory disease
7. Principles of inflammation and infection
8. Ultrastructural manifestations of infection
9. Pyogenic bacterial diseases
10. Granulomatous bacterial diseases
11. Other bacterial diseases
12. Virus and rickettsial diseases
13. Fungal and parasitic diseases
14. Immunopathology
15. Glomerulonephritis
16. Rheumatic fever and collagen diseases
17. Inflammations of unknown etiology
18. Tumors of the breast
19. Tumors of the lung
20. Other diseases of the lung
21. Tumors of the gastrointestinal tract
22. Other diseases of the gastrointestinal tract
23. Diseases of the liver
24. Fine structure of hepatic disease
25. Cytology and gynecological cancer
26. Other gynecologic diseases
27. Tumors of soft tissues
28. Tumors of bone and skin
29. Lymphomas and leukemia
30. Fine structure of carcinoma
31. Diseases of the heart and blood vessels
32. Arteriosclerosis
33. Cardiac failure
34. Fine structure of myocardial and muscular diseases
35. Cardiovascular-renal disease and renal failure
36. Genitourinary diseases
37. Diseases of the central nervous system
38. Diseases of the central nervous system
39. Diseases of the central nervous system
40. Diseases of the central nerous system
41. Diseases of the central nervous system
42. Diseases of the central nervous system
43. Diseases of the central nervous system
44. Legal medicine and forensic pathology
45. Poisoning and chemical diseases
46. Occupational diseases
47. Radiation
48. Nutritional diseases
49. Metabolic diseases
50. Diseases of the pancreas and diabetes
51. Diseases of the thyroid
52. Diseases of the skin.

CORE PATHOLOGY COURSE
#4

Goals and Objectives

I strongly believe that the required course in Pathology in medical school should take form of a survey and should therefore be considerably condensed relative to the classical comprehensive course formerly taught. In my view medical education has reached the point where greater flexibility must be introduced into the curriculum. Such flexibility implies among other things shortening of the required curriculum, providing large blocks of time for elective programs. The multi-track concept of medical education does obtain in some schools and I believe will be widely used. Based on these probabilities I believe that the required course in Pathology should be a survey course permitting students who are interested in internal medicine and surgery as distinct from the social sciences to have electives in-depth at a later date. The survey course should comprise general processes and specific diseases or, put in another way, general pathology and systemic pathology. It should be focused toward providing the student an opportunity for an understanding of clinical disease, and should therefore be oriented strongly toward functional consequences and clinical significance.

The survey course in Pathology is divided into a core course on general processes and principles (100 hours) followed by an integrated block consideration of the major systems of the body in which Pathology and Clinical Medicine use approximately 90% of the time (Pathology 80 hours). Also integrated into this General Biology of Disease are the other basic science departments and other relevant clinical departments. During the first semester core course time is allotted to Pathology specifically in blocks totalling approximately 100 hours. This is spread over approximately 10 weeks representing therefore 10 hours per week. The 10 hours are divided into two 3½ hour sessions and one 3 hour session. Each of these 3 or 3½ hour blocks of time is divided into a 1 hour lecture or seminar, 1 hour of microscopic survey of a set of class slides and 1 hour devoted to gross demonstration, pan cases, clinico-pathologic correlation, CPC's or a variety of other activities all of which are designed to correlate Pathology with Clinical Medicine. In years past, considerable emphasis was placed on the lecture but this was enforced by virtue of a very small staff. It is anticipated that in the coming year there will be less reliance on lectures which will be replaced by previously prepared mimeographed syllabi and then dividing the class into small groups with informal discussion of the syllabus. The syllabus will be supported by text and reference reading. The laboratory sessions on microscopy are conducted in the Base Laboratories of the students, 16 to a room, covered by one or two instructors in each room. Most of the gross material has been presented in the form of complete pan cases although some reliance is placed on individual fresh and fixed organ demonstration since this material is usually more relevant to the theoretic discussion than the pan case. However it has been my experience that isolated organs do not have the teaching value of the pan case which provides an opportunity to discuss the entire clinical background as well as presentation of laboratory and x-ray supporting information. During this first portion of General Pathology, CPC's are given intermittently. These are generally done in conjunction with a member of the Department of Medicine. The students are handed the protocol in advance and are asked to consider it in considerable detail and come in prepared for discussion. The CPC is not conducted in the usual orthodox fashion but rather is conducted in the form of an informal discussion in which the clinician leads the clinical discussion, the pathologist contributing at the same time, followed by a similar type of pathology discussion. The students are asked for instance what would they expect to find at autopsy in the case under discussion. As much as is possible, the activity is limited to the leading of the student discussion rather than the presentation of a CPC.

Systemic Pathology is integrated into a course in Pathophysiology or Biology of Disease. This runs approximately 20 weeks (four hours per week for Pathology). The integration takes the form of a group including clinicians, physiologists, pathologists, etc. deciding on the basic content of the 1-2 week period of time allotted to the subject, with decisions made as to the order of presentation of material and then as close integration as possible between Physiology, Biochemistry, Clinical Medicine and Pathology. By and large, because insufficient faculty manpower is available, sessions are covered only by the involved department. It therefore does not represent the entire faculty team sitting in on all sessions. This is not ideal but it is necessary in the setting in which this course is given. Within the framework of the 20 week period, generally 1½ weeks are given for such major systems as the heart and cardiovascular system (Pathology input 6 hours), a similar period of time for the lungs, G.I. block, urinary block, while the other blocks receive about a 1 week period which represents 5 school days. During the Pathology input within the integrated program, time is earmarked for lectures, seminars, microscopy and case presentation similar to that already described in the course in General Pathology.

Content of Course

General Pathology includes the following major areas:

1. Cell injury, adaptation, response and death
2. Tissue injury and death, to include inflammation
3. Circulatory changes, to include hemorrhage, infarction, shock
4. Neoplasia
5. Genetics and hereditary diseases
6. Immunology and sensitivity disorders

It is not necessary to review the Pathobiology course since the block treatment is standard but no effort is made to cover all disorders, and the effort is rather toward covering in-depth major diseases with some time spent on diseases of second order importance and all others are omitted and left to reading.

The total amount of Pathology time in the second year is approximately 180 hours. As indicated, this is divided into about 100 hours of General Pathology and 80 hours of Special Pathology. However this Special Pathology time is obviously supported and buttressed by the close integration of other lectures which present the clinical material, the laboratory setting and discussion of etiology and pathogenesis. Often in this etiologic and pathogenetic discussion, the pathologist contributes to the clinical discussion. The entire second year occupies approximately 1,000 curriculum hours. During their second year the students also have Pharmacology, Microbiology, Psychiatry, Physical Diagnosis and Clinical Laboratory Medicine, not under the supervision of the Department of Pathology. The students are in class 4½ days a week, with Wednesday afternoon and Saturday mornings free. During the Wednesday afternoon, elective programs are offered in Pharmacology, Microbiology and Pathology, which the students may at their own option take. It has been my experience that these electives in Pathology are attended by about a fifth of the class. These electives comprise in-depth seminars on such subjects as newer concepts in cardiovascular disease, experimental oncology, etc.

Observation of autopsies has been reduced to a minimum. The class is divided into small groups of 8 students on call for the witnessing of autopsies at various hospitals. Since the availability of the students only occurs within Pathology time, on an average each student sees 1 or at most 2 autopsies during the year. It is however intended that during the third year, when the students are on the wards, that they will be required to witness the autopsy of any patient for whom they have had any responsibility with a written clinico-pathologic reconciliation to be submitted within 2 weeks. Such a reconciliation will be reviewed by both the departments of Medicine and Pathology. This program is to be activated during the coming school year so that it is impossible to determine how successful it will be or how many autopsies the students will see in this fashion. The effort here is made entirely to provide clinico-pathologic correlation rather than the study of morbid anatomy.

CORE PATHOLOGY COURSE
#5

The first three weeks of Pathology (33 hours) constitute a complete course within a course during which we will present an overview of the entire field of anatomical and clinical pathology. It is hoped that this will give you an appreciation of the multiple disease entities commonly found in the intact organism as well as stimulate you to seek greater understanding and knowledge concerning the mechanisms of disease. The two ensuing sections of the course, Pathobiology (5 weeks) and Systemic Pathology (15 weeks), will provide the depth needed for an understanding of modern theoretical biology and medical practice.

This Survey of Pathology includes the following:

A. A series of lectures with each major system given appropriate time.

B. A syllabus presenting the major material to be covered in the survey.

C. Laboratory discussion sessions during which you will have the opportunity to study pathologic material.

WEEK 1

Introduction - Inflammation - Repair

Hypertrophy - Hyperplasia - Neoplasia

Heart disease: Classification - Arteriosclerotic heart disease - Thrombosis and infarction

Vascular disease: Arteritis - Aneurysm - Athero - and arteriosclerosis

Pulmonary disease: Classification - Neoplastic disease

Emphysema - Fibrosis - Granulomas

WEEK 2

Hepatobiliary disease: Classification - Hepatitis - Cirrhosis - Fatty liver

Cholecystitis - Cholelithiasis - Jaundice - Obstruction

Gastrointestinal disease: Inflammations and ulcers - Tumors - Malabsorption
Pancreatic disease

Endocrine disorders: Pituitary, adrenals, thyroid, parathyroids, islets of pancreas

Diseases of the reproductive organs: Cervix and corpus uteri, oviducts, ovaries, breasts, testes, prostate

Diseases of the skeletomuscular system: Bones, joints, muscles

WEEK 3

Diseases of the kidneys: Classification - Glomerulonephritis - Pyelonephritis
Diseases of the bladder

Hypertension - Uremia

Disorders of the hematopoietic and reticuloendothelial systems: Classification - Anemia - Leukopenia

Leukemia - Lymphoma - Lymphosarcoma

Diseases of the skin: Classification - Carcinoma - Melanoma

Diseases of the nervous system: vascular, infectious, neoplastic